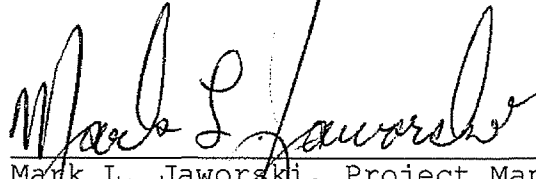


INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
EXPANDED SITE INSPECTION
FOR
GARY DEVELOPMENT LANDFILL
GARY, INDIANA
LAKE COUNTY
U.S. EPA ID: IND077005916
November 18, 2009

Signature Page
for
Gary Development Landfill
Expanded Site Inspection
Gary, Indiana
Lake County
U.S. EPA ID: IND077005916

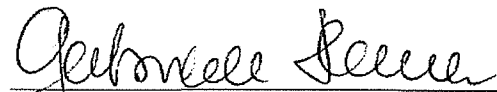
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SECTION I
INTRODUCTION

The Indiana Department of Environmental Management (IDEM) Site Investigation Section, under a Cooperative Agreement (CA) with the United States Environmental Protection Agency, Region V, has been funded to perform an Expanded Site Inspections (ESI) at certain sites listed in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS). This work is conducted under the authority of the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (aka Superfund), and the Superfund Amendments and Reauthorization Act (SARA) of 1986. Sites eligible for ESIs include those sites for which the Site Inspection or Reassessment did not conclude that 'No Further Remedial Action is Planned' (NFRAP), as reflected in CERCLIS.

The primary objectives of the site ESI are:

- To collect additional data, using the Hazard Ranking System (HRS), required to make the determination of whether the site should be placed on the National Priorities List (NPL);
- To identify sites that may require removal actions to address immediate threats to human health and/or the environment.

The Site Investigation Section was given approval by the U.S. EPA to conduct a sampling event as an addendum to the ESI at the Gary Development Landfill after the site was referred to CERCLA from the Resource, Conservation, and Recovery Act (RCRA) program.

The site operated from 1975 to 1989 (Reference DD). The site is now abandoned and the corporation dissolved. The site accepted volatile organic compounds, semi-volatile organic compounds, asbestos, metal containing waste, and pesticides, in addition to household wastes.

A review of IDEM records show that uncontrolled and untreated drainage was allowed to discharge directly into the Grand Calumet River at the time the landfill was active. An SSI was conducted in 1984 and a Site Inspection Prioritization (SIP) was conducted in 1994. A Site Reassessment was conducted in 2005.

Information contained within this report will be used to evaluate this site under the Hazard Ranking System Model for possible inclusion on the National Priorities List (NPL) of hazardous waste sites.

SECTION II
SITE BACKGROUND

2.1 Introduction

This section includes information obtained from the IDEM-RCRA and CERCLA files.

2.2 Site Description and Location

The Gary Development landfill operated from 1975 to 1989 (Reference DD). The site is now abandoned and the corporation which the facility is dissolved. The site was owned and operated by the Gary Development Company Inc. Mr. Larry Hagen was the president of the company.

The site is 62 acres total, of which approximately 55 acres were utilized for solid and hazardous waste disposal (Reference Q, R). The site can be found on the U.S.G.S. Highland, Ind. Quadrangle Topographic Map. The site lies in the Southwest corner of section 35 in Township 37 North, Range 9 West. The site lies adjacent to the Grand Calumet River about 1000 feet west of the Gary Airport in an industrial setting south of Lake Michigan. The site is within the Grand Calumet River/Indiana Harbor Canal area of concern as outlined in EPA's Great Lake National Program Office.

The majority of the area is flat with grassy areas where streets, houses, parking lots, and buildings are not present. Refer to Figure 1.

The Gary Development Landfill is comprised of three (3) parcels. The first parcel to the east contains 40 acres. The owner of the parcel was listed as Gary Development Co. Inc. Taxes for the parcel were listed as government exempt for numerous years. Lake County Auditors staff stated that this may have been in error.

The second parcel consists of 5.9 acres. This parcel was originally owned by Gary Development Co. Inc. but taxes were past due and never paid. As a result of unpaid taxes, the parcel was sold on 8-8-03 to J.B. Moody, Gary, Indiana. Taxes have not been paid since on this parcel since J.B. Moody purchased the property.

The third parcel consists of approximately 15 acres. The parcel is currently owned by the Lake County Board of Commissioners. The site went up for sale at the Treasurer Tax Sale on 10-15-09. The parcel was not sold. Since back taxes have not been paid for numerous years, the entire site is considered abandoned site with no viable owner (Reference UU).

2.3 Site History

The Gary Development Landfill was a permitted solid waste landfill that illegally accepted hazardous waste for disposal. The landfill had neither achieved interim status under RCRA nor obtained a RCRA permit (Reference A). The sanitary/industrial landfill accepted materials including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), asbestos, metals, and pesticides (References C, G, I, J, S, T, U V, W, Y, Z, AA, DD, EE, FF, JJ, KK, NN, OO).

In early 1973, the operator of the landfill began to explore developing a sanitary landfill in a mined-out, water-filled, sand pit. On May 15, 1973, the Indiana Stream Pollution Control Board (SPCB) approved the operator's proposal to dewater the sand pit. On June 19, 1973, SPCB granted the operator's construction permit SW133, allowing preparatory construction work for a sanitary landfill to begin. On August 29, 1974, the State conducted its final inspection of the site, which led to SPCB's granting final approval to the operator to commence sanitary landfill operation. The landfill began accepting solid waste for disposal in September, 1974. On February 20, 1975, SPCB sent the operator its operating permit, No. 45-2.

On May 20, 1980, SPCB approved an Agreed Order negotiated between the operator and SPCB staff. This order required that the operator submit an application for a modification of its original construction permit.

On February 16, 1982, the Indiana Environmental Management Board (EMB) notified the operator by two (2) letters, indicating that its Operating Permit No. 45-2 had been renewed and that its revised construction plans had been approved subject to several conditions (EMB replaced SPCB as the Indiana Agency responsible for landfill permits). The amendment to the permit included the following conditions: 1) that sandy, granular material under the unified soil classification of SW and SP not be used for daily cover, 2) that the clay perimeter seal be compacted to 90% Standard Proctor density, 3) that results of compaction tests conducted on the perimeter seal be submitted to the Division of Land Pollution Control staff within 15 days of completion of the tests, 4) that after each section of leachate collection pipe is installed, it be inspected by a Division of Land Pollution Control staff member before it is covered, 5) that the discharge of water from the site to the Grand Calumet River or other waters of the State of Indiana shall not occur except in conformity with an approved NPDES permit, 6) that the seepage collector pond detailed on Page 7 of the Engineering Plan not be installed unless a seepage problem is identified, 7) that the dike between the Grand Calumet River and

the landfill be increased in elevation to 589.7 MSL, 8) that the four (4) on-site monitoring wells be sampled on a quarterly basis, and 9) that hazardous waste as defined in 300 IAC 4-2-1 not be accepted at this site after 60 days from the date of receipt of this letter. All hazardous waste approvals for the site were considered by IDEM to be void following issuance of the amended permit.

In May of 1982, the operator appealed the conditions of the approved February 16, 1982 operating permit. In February 1983, Environmental Management Board and the operator negotiated a Recommended Consent Order and the Final Order was approved February 18, 1983.

Figure 1



A geologic assessment conducted by the Indiana Department of Health determined that the site was geologically unsuitable for waste disposal (Reference P). According to inspection reports that were completed at the time the landfill was active, a sufficient cap over the landfill is essentially absent. The inspection reports (from 1-30-87 through 5-20-88) also indicated that the operator had used fly ash as cap material Ref. BB). The use of fly ash was never approved by IDEM. A review of IDEM inspection reports and past inspector statements indicate that the landfill had no adequate engineered liner nor adequate clay side walls. Aerial photographs depict that leachate collection ponds were installed while the landfill was active.

A review of IDEM records shows that uncontrolled and untreated drainage was allowed to discharge directly into the Grand Calumet River when the landfill was active (References E, F, BB, JJ, MM). No NPDES permit was obtained for off-site discharge (Reference FF). According to IDEM documents, the operator of the landfill contested whether he operated a hazardous waste landfill and did not attempt to meet RCRA and State hazardous waste regulations (References J, CC, DD, II, JJ, KK, LL).

Four (4) monitoring wells were installed on site by the operator. The water in the monitoring wells was collected by an EPA contractor in 1990 and analyzed by an EPA approved laboratory (Reference J). Low levels of some metals, volatile organic compounds, semi-volatile organic compounds, and pesticides were detected. However, the pesticide and PCB results were not usable because instrument calibration was out of control, and sodium, TOC and sulfide results were estimated because either no matrix spike sample was analyzed or the matrix spike sample was out of control (Reference O).

In May 1986, U.S. EPA issued an administrative complaint and compliance order, which alleged that Gary Development Landfill accepted hazardous waste for disposal at their landfill which did not have interim status under RCRA nor obtained a RCRA permit (References B, H, L). Gary Development's appeal of this order was dismissed as untimely in August 1996. After negotiation, a consent decree required Gary Development to pay \$86,000 in fines and contribute \$40,000 into a trust fund (Reference N). The monies in the trust fund were to be used by IDEM for the purpose of performing closure and post-closure care of the landfill, and conducting a ground water quality assessment program. In addition, the monies were to be used for remediation of contamination and/or the prevention of releases of hazardous substances at the site.

March 2000 cost estimates for site assessments, cover and vegetation, erosion control measures, ground water monitoring

wells, gas system installation-flares, drain and fill ponds, and other work range between 2.5 and 3.0 million, which far exceeds the amount in the trust fund (References XX, YY). Due to a lack of funds to adequately address closure and post-closure activities at the site, the site was deferred to CERCLA from the RCRA program (Reference A).

During a routine inspection, IDEM identified several abandoned drums at the site on January 8, 2002. Two (2) of the drums on the south apron of one of the buildings, approximately 75 feet from the Grand Calumet River, appeared to be leaking an unknown type of oil causing a sheen in the rainwater on the pavement. At that time, IDEM notified U. S. EPA of the situation and asked for assistance in stabilizing the drums. In January 2002, U.S. EPA, along with the Superfund Technical Assistance Response Team (START) contractor investigated the release. As a result, a Time Critical Removal Action at the Gary Development Landfill site was conducted. Numerous containers of substances including oils, paint, insecticides, antifreeze, and electrical capacitors were removed from the site (Reference WW).

On April 20, 2005, staff from IDEM's Site Investigation Section conducted a Site Reassessment at the Gary Development site. On-site and off-site ground water and wetland sediment samples were collected. Elevated levels of metals, semi-volatile organic compounds, and pesticides were detected in the on-site wetland samples. After reviewing the data from the investigation, it was determined that the background samples were not representative of the Grand Calumet River; therefore an ESI was conducted on April 16, 2009.

SECTION III
PROCEDURES, FIELD OBSERVATIONS AND
ANALYTICAL RESULTS

3.1 Introduction

This section outlines the procedures, observations and analytical results for the Gary Development Landfill ESI.

3.2 Site Reconnaissance Inspection

On April 16, 2009, Mark Jaworski, Project Manager, along with Dan Chesterson and Mike Sickels (IDEM staff members), conducted an on-site reconnaissance inspection. Prior to the inspection, the project manager attempted to obtain permission from the Lake County Auditors Office and the Lake County Commissioners. Telephone conversations with both of county offices indicated that the site was considered abandoned with no liable party. On-site and background sample locations were established to determine natural environmental conditions of the immediate area. Inspection of the site revealed the following observations:

- 1) The site lies in a predominantly industrial area.
- 2) The site is covered with weeds and grasses.
- 3) Some areas of the landfill are devoid of vegetation. No leachate seeps were observed.
- 4) Some metal and plastic debris was observed protruding out of the ground.
- 5) Vent pipes were observed along the southwest sector of the

site.

- 6) Abandoned equipment, (i.e. crane, Jeep, fuel truck, and other debris) was observed throughout the site.
- 7) Two (2) abandoned buildings were observed along the southwestern corner of the site.
- 8) The site was not fenced. A locked gate was present at the entrance to the site.

3.3 Sample Procedures and Analytical Results

The laboratory results from the 2009 sampling of the Gary Development site have been determined to be acceptable for use and meet the criteria contained in the Contract Laboratory Program (CLP). (Refer to Analytical Results in Appendix 7)

Any exceptions to the acceptance of this data will be identified in the QA/QC memorandum by the U.S. EPA chemists. (Refer to Appendix 7)

3.3.1 Soils/Sediment Sample Collection

On May 5, 2009 sediment samples were collected by IDEM at locations selected during the April 16, 2009 reconnaissance inspection. The samples were collected to establish the presence of contamination (Figures 2 and 3). No soil samples at the landfill itself were collected to avoid disturbance of any remnant cap material and concerns regarding methane releases. All samples were only collected in wetland areas adjacent and upstream (background) to the landfill.

A total of 20 soils/sediment samples were collected at 10 locations as approved in IDEM's work plan and QAPP. A shallow sample (0-12 inches) and a deep sample (12-24 inches) were obtained at each location. The 20 soil/sediment samples were identified as E2QQ1/ME2QQ1 through E2QQ8/ME2QQ8, E2QR1/ME2QR1 through E2QR9/ME2QR9, and E2QS0/ME2QS0 through E2QS2/ME2QS2. Table 1 indicates the sample number, location, and any comments pertaining to each sample. The sampling locations are shown on Figures 2 and 3. The sediment samples were obtained using a shovel. The samples were deposited in a dedicated stainless steel bowl after the sample was obtained with the shovel. The soils/sediments were homogenized in the stainless steel bowl with a disposable plastic scoop. The homogenized material in the bowl was directly transferred into the sample jar using the plastic scoop. Latex surgical gloves were worn and discarded between the collection of each sample.

3.4 Summary Tables

All samples were analyzed for SVOCs, PCBs, pesticides, and metals. Background sample results are found in Table 2. Tables 3 through 6 summarize the contaminant concentrations detected three (3) times above background. Refer to Appendix 7 for a complete list of the chemical analysis data provided by the laboratory.

Table 1
Sediment Sample Location and Comment Table

<u>CLP ID #s</u>	<u>SED #</u>	<u>Location</u>	<u>Comments</u>
E2QQ1/ME2QQ1	SDA1	60 feet west of airport strobe light at east end of runway	Color: black-10YR2/1*; sample collected from 0-12 inches; predominant vegetation is phragmites; background sample
E2QQ2/ME2QQ2	SDA2	60 feet west of airport strobe light at east end of runway	Color: black-10YR2/1*; inundated; sample obtained from 12 -24 inches; dominant vegetation is phragmites; background sample
E2QQ3/ME2QQ3	SDB1	Near the intersection of Durbin Street and Riverside; south side of river	Color: black-10YR 2*; water in hole within 3 minutes; saturated; background sample; dominant vegetation is phragmites; sample collected from 0-12 inches;
E2QQ4/ME2QQ4	SDB2	Intersection of Durbin Street and Riverside	Color: black-10YR2/1*; 12-24 inches; inundated; background sample; dominant vegetation is phragmites
E2QQ5/ME2QQ5	SDC1	100 yards S/SW of Gary Airport Bill-board; north bank of Grand Calumet River	Color: black- sample collected from 0-12 inches; 0-3 inches-7.5YR2.5*; 3-12 inches- 7.5YR3/2* with mottles of 7.5 YR4/6*; dominant vegetation is Typha A; background sample
E2QQ6/ME2QQ6	SDC2	100 yards S/SW of Gary Airport Bill-Board; north bank of Grand Calumet River	Color: black-sample collected from 12-24 inches; Gley 1 4/N* inundated; predominant vegetation is phragmites; background sample

Sediment Sample Location and Comment Table (continued)

<u>CLP ID #s</u>	<u>SED #</u>	<u>Location</u>	<u>Comments</u>
E2QQ7/ME2QQ7	SDD1	Southwest corner of Airport property	Color: black-10YR2/1*; inundated; predominant vegetation is phragmites
E2QQ8/ME2QQ8	SDD2	Southwest corner of Airport property;	Color: black-10YR2/1*; inundated; predominant vegetation is phragmites
E2QQ6/ME2QQ6	SDC2	100 yards SSW of Gary Airport Bill-board; north bank of Grand Calumet	Color: black- sample collected from 12- 24 inches; Gley 1 4/N; inundated; predominant vegetation is phragmites
E2QR1/ME2QR1	SDE1	South of first Grouping of trees; past end of access road, over halfway to river	Color: black-10YR3/2*; saturated; sample obtained from 0-12 inches; predominant vegetation is phragmites
E2QR2/ME2QR2	SDE2	South of first grouping of trees; past end of access road, over half way to the river	Color: black-10YR3/2*; saturated; predominant vegetation is phragmites
E2QR3/ME2QR3	SDF1	South of first grouping of trees past end of access road; over half way to the river	Color: black-10YR2/1*; oil sheen observed on water; petroleum odor; sample collected from 12-24 inches; predominant vegetation is phragmites
E2QR4/ME2QR4	SDF2	South of first grouping of trees past end of access road, over halfway to the river	Color: black-10YR2/1*; petroleum odor; sample collected from 12-24 inches; predominant vegetation is phragmites

Sediment Sample Location and Comment Table (continued)

<u>CLP ID #s</u>	<u>SED #</u>	<u>Location</u>	<u>Comments</u>
E2QR5/ME2QR5	SDG1	Near the east and west center of phragmites field area, halfway between road and river	Color: black-10YR/4/2*; moist; sample obtained from 0-12 inches; predominant vegetation is phragmites
E2QR6/ME2QR6	SDG2	center of phragmites field, east of end of access road, between road and river	Color: black-10YR2/1*; petroleum staining at 22 inches; sample obtained from 12-24 inches; predominant vegetation is phragmites
E2QR7/ME2QR7	SDH1	Western most sample, south of access road in phragmites field	Color: black-10YR3/2*; sample obtained from 0-12 inches; predominant vegetation is phragmites
E2QR8/ME2QR8	SDH2	Western most sample, south of access road in phragmites field	Color: black-10YR3/1*; sample obtained from 0-12 inches; predominant vegetation is phragmites
E2QR8/ME2QR8	SDH2	Western most sample, south of access road in phragmites field	Color: black-10YR3/1*; sample obtained from 0-12 inches; predominant vegetation is phragmites
E2QR9/ME2QR9	SDI1	Southeast of first grouping of trees past end of road; southern most sample location, east of sample E2QR1	Color: black-10YR2/1*; slight petroleum odor, sheen on water; inundated; sample obtained from 0-12 inches; predominant vegetation is phragmites

Sediment Sample Location and Comment Table (continued)

<u>CLP ID #s</u>	<u>SED #</u>	<u>Location</u>	<u>Comments</u>
E2QS0/ME2QS0	SDI2	Southeast of first grouping of trees east end of access road, southern most sample location, east of sample E2QR1	Color: black-10YR2/1*; petroleum odor, sheen on water; inundated; sample obtained from 0-12 inches; predominant vegetation is phragmites
E2QS1/ME2QS1	SDJ1	South of first grouping of trees past end of the road	Color: black-10YR3/1*; solvent odor; inundated; sample obtained from 0-12 inches; predominant vegetation is phragmites
E2QS2/ME2QS2	SDJ2	South of first grouping of trees past end of the road; north of E2QR1	Color: black-10YR2/1*; solvent odor; inundated; sample collected from 12-24 inches; predominant vegetation is phragmites

* Note: 7.5YR2.5, 7.5YR3/2, 7.5 YR4/6, 10YR2/1 are color codes derived from the Munsell Color Chart

Figure 2

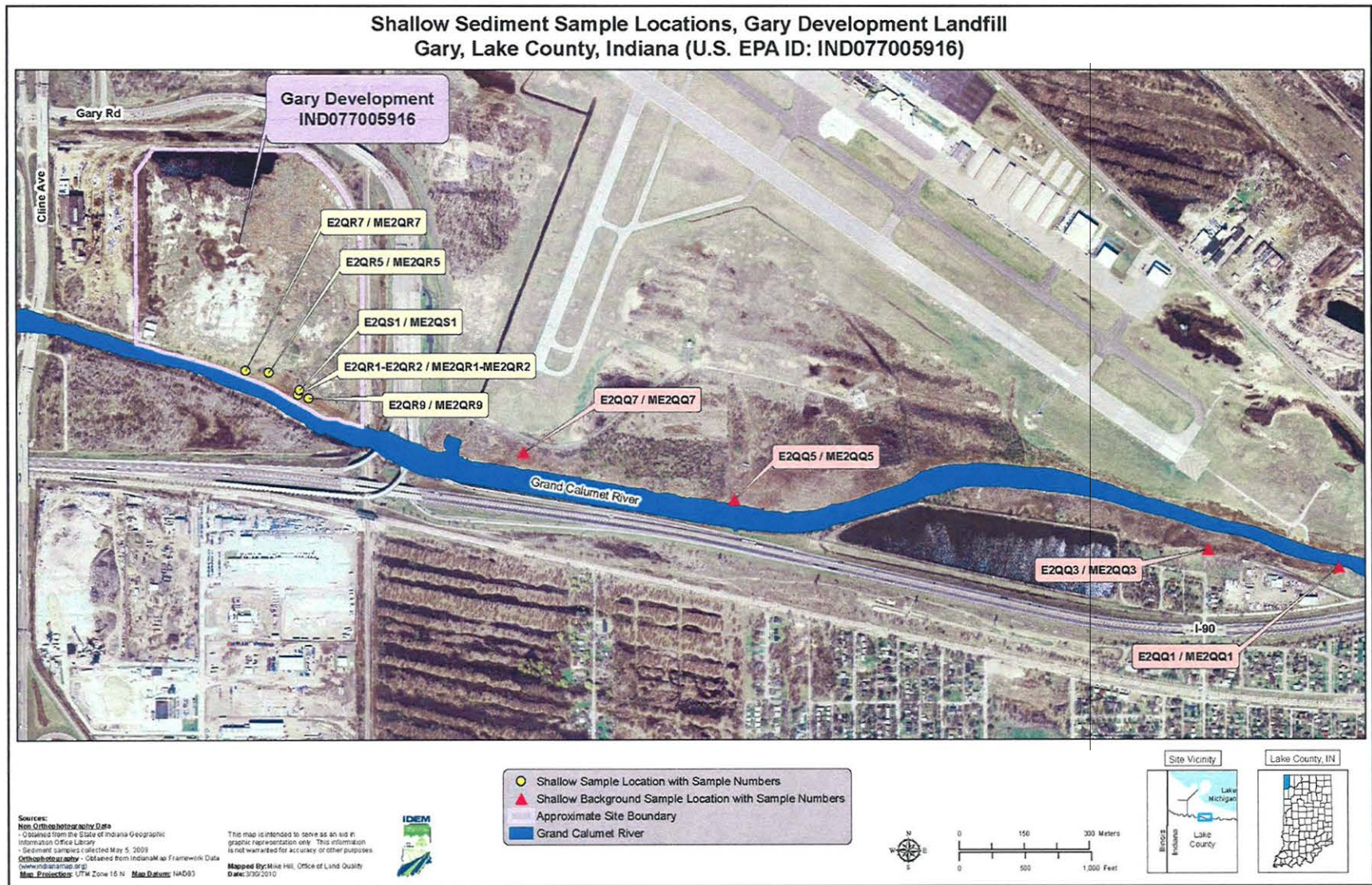
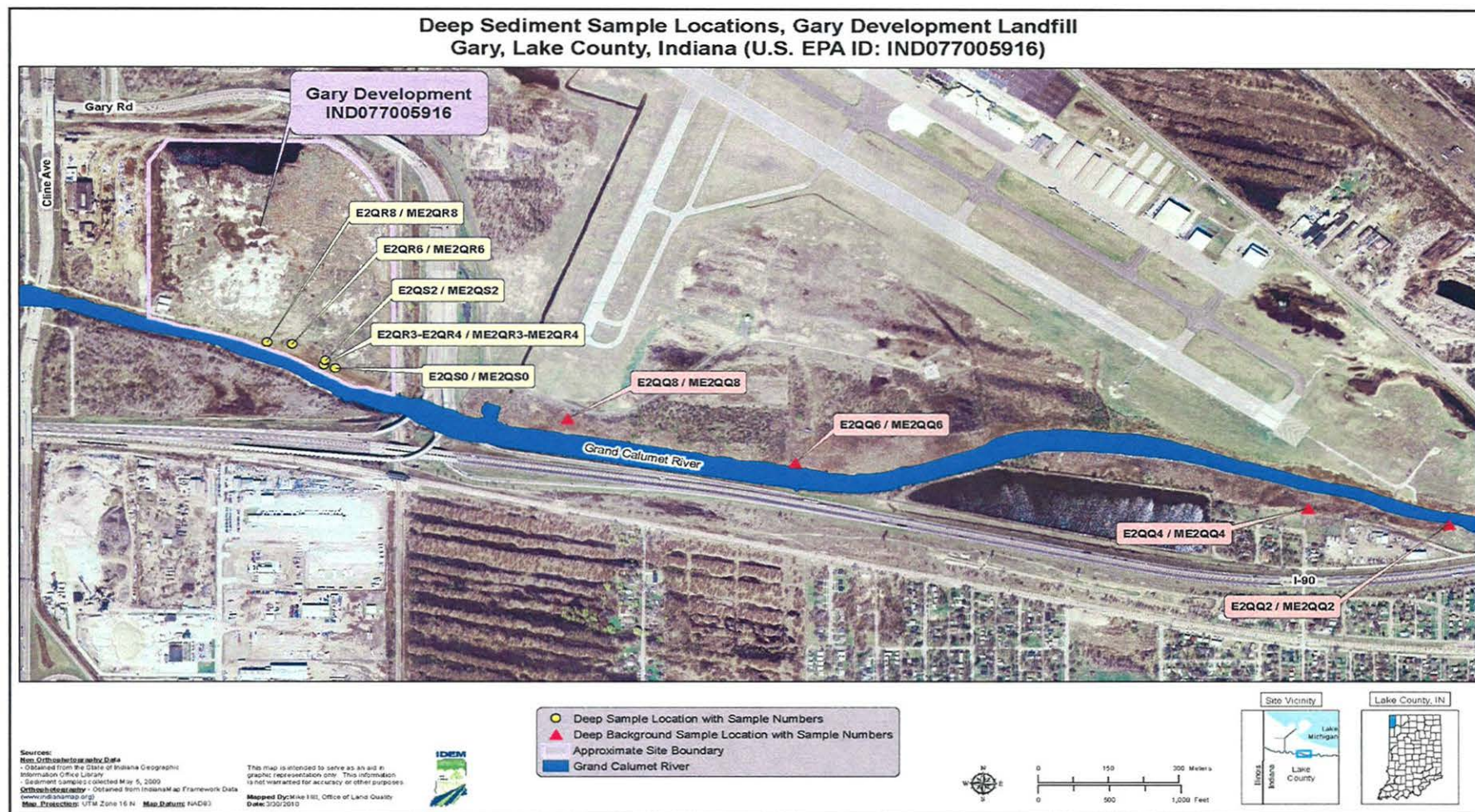


Figure 3



SECTION IV

DISCUSSION OF MIGRATION PATHWAYS

4.1 Introduction

Potential migration pathways for contaminants migrating from the Gary Development Landfill site are discussed in this section. In particular, potential contaminant migration through ground water, surface water (including drinking water threat, human food chain threat, and environmental threat), soil exposure, and air are discussed, where applicable.

4.2 Ground Water Pathway

The Indiana Department of Natural Resources (IDNR) well logs indicate that the Gary Development Landfill is underlain by layers of sand and gravel with some layers of till/clay (Ref. P).

Regional ground water flow is to the north. The bedrock at this site consists of Middle Silurian (Niagaran) dolomites that dip gently toward the northwest. About 160 to 170 feet of unconsolidated material lies above the bedrock at the site and may be divided into three distinct units. The deepest unit is a silty, pebbly clay till which rests upon the bedrock. In this area, the basal part of this unit is zone of sand and gravel about 15 feet thick which is part of a narrow valley-fill deposit. Above this unit is a silty, sandy and pebbly clay till with discontinuous lenses of sand and gravel. This clay is subject to cracking and is very hard when dry. The unit exposed at the surface consists of 25

to 35 feet of very fine-grained beach and dunal sand that is stratified and moderately cross-bedded. It contains some thin partings of silt and clay. An 18-inch layer of silt separates the sand from the underlying clay.

The use of ground water near this site is low due to the availability of municipal water and lack of residential development. Ground water exists under unconfined conditions and the original water table in this area was within two (2) feet of the ground surface. Before the Gary Development Landfill operation began, the site was an open pit created by a sand mining operation. Water had filled the pit to about the same elevation as the nearby Grand Calumet River, attesting to the hydraulic continuity of the ground water and surface-water systems in this area. According to a geologic description and evaluation of the landfill while it was active, the regional hydraulic gradient was locally south-westward into the river, but the dewatering of the pit had created a reversal of the gradient and river water seeped into the pit area because of the head differential (the pit bottom is approximately 30 feet lower than the surface of the river) (Ref. P). Since the landfill is inactive and the former pit has been backfilled, this reversal no longer occurs. The hydraulic conductivity of the deepest till unit is 1.4×10^{-7} cm/sec while that of the clay immediately beneath the sand unit is 3.3×10^{-7} cm/sec. The sand unit has a hydraulic conductivity of .02 cm/sec, a coefficient of transmissivity of 21.6 cm²/sec, (unconfined) conditions exist.

The population of Gary and the surrounding area utilizes municipal surface water intakes located in Lake Michigan for drinking water. There are no ground water wells identified downgradient from the site that are used for drinking water. No ground water samples were obtained for this inspection.

4.3 Surface Water Pathway

Overland flow from the site enters the Grand Calumet River which is located adjacent to the southern property boundary. The southern perimeter of the site is located in the floodplain of the Grand Calumet River. The Grand Calumet at this location generally discharges into Lake Michigan via the Indiana Harbor Canal. The East Fork of the Grand Calumet River flows west into the Indiana Harbor Canal approximately two (2) river miles from Gary Development Landfill. The Indiana Harbor Canal connects the Grand Calumet River with Lake Michigan via the Indiana Harbor. The confluence of the Indiana Harbor and Lake Michigan is approximately 6.7 miles from the Gary Development Landfill site. The strong influence from Lake Michigan can cause water from the East Fork of the Grand Calumet to flow past the Harbor Canal to a surface water divide near the Indiana Toll Road or even eastward from the Gary Development Landfill site.

4.3.1 Drinking Water Threat

Residents within Gary, Indiana obtain drinking water from surface water intakes located in Lake Michigan. Many of these

intakes lie within the 15 mile surface water pathway for the Gary Development Landfill. No known drinking water problems exist for these cities and it is improbable that contaminants attributable to activities at Gary Development Landfill would be far enough to reach these surface water intakes due to the nature of the contaminants involved and the amount of dilution that would take place even if they reached Lake Michigan.

4.3.2 Human Food Chain Threat

The Grand Calumet River (GCR) and Lake Michigan are considered fisheries. Currently, there is a Fish Advisory posted for Lake Michigan and the GCR for PCBs. Extensive contamination has been documented in the Grand Calumet River and Indiana Harbor Canal flowing through Lake County.

As discussed in 4.2, a ground water to surface water pathway may exist and could allow the contaminants from this site to flow into the Grand Calumet River impacting the human food chain pathway. However, no samples were collected in the Grand Calumet River to assess the human food chain threat for this inspection.

4.3.3 Environmental Threat

A survey conducted by the Indiana Department of Natural Resources/Division of Nature Preserves/Heritage Program (IDNR/DNP/HP) indicated that there are numerous endangered or threatened species and sensitive environments within the surface water pathway of the Gary Development Landfill site. Refer to

Appendix 3 for a detailed list of these special concerns. Numerous semi-volatile organic compounds were detected in the soils/sediments of the wetland area located on the south side of the landfill. These wetland soils/sediments are located near habitats known to be used by several endangered species, specifically the Marsh Wren, Least Bittern, Upland Sandpiper, Common Moorhen, Black Tern, and Yellow-headed Blackbird. The wetland area on the south side of the Gary Development Landfill is considered a unique area, relatively small in size, important to maintenance of unique biotic communities.

Ten soil/sediment samples were obtained from the wetland area located on the south side of the Gary Development Landfill. Various concentrations of metals, at levels three (3) times above background, were detected in all soil samples. The lead concentration in sample E2QR9 was 1740 mg/kg. Elevated levels of Chromium were detected in samples EE2QR3, E2QR9, and E2QS0. Chromium levels in these samples ranged from 1225 mg/kg through 1574 mg/kg. Figure 4 displays the locations where elevated metals were detected.

Numerous SVOCs, specifically benzo(a)pyrene, benzo (b) fluoranthene , benzo(k)pyrene, and indeno(1,2,3-cd)pyrene, were detected at various levels in soil samples E2QR3, E2QR4, E2QR9, and E2QS2 at levels greater than three times background. Figure 5 shows the locations where elevated SVOCs were detected.

Elevated levels of some pesticides (at levels greater than three times background) were detected in samples E2QR3, and, E2QS2. The high concentrations of pesticides include beta-BHC (ranging 11 to 24 ug/kg), and Endosulfan I (at 11 ug/kg). Elevated levels of PCB aroclor 1248 PCBs (at levels greater than three (3) times background) were detected in sample E2QS2 at a concentration of 230,000 ug/kg. Refer to Figures 6 and 7 for the locations where elevated pesticides and PCBs were detected.

Tables 3 through 6 show all concentrations of metals, VOCs, SVOCs, PCBs, and pesticides soil sampling results, which were at least three times above background concentrations. Table 2 lists the background concentrations of analytes detected and its corresponding three times concentration value. The Wetland Frontage Map, Figure 8, shows the distances between each impacted wetland sample collected. Combined wetland frontage of locations with contaminants greater than three (3) times background is calculated to be 532.32 feet.

4.4 Soil Exposure

A gate is present at the entrance to the Gary Development Landfill, however, the site is not fenced. Even though the site lies in a predominantly industrial area, the site is still accessible to the public. Numerous sensitive environments lie on or near contaminated soils. There are no workers on site and no day care facilities within 200 feet.

4.5 Air Pathway

No air samples were taken. While collecting sediment samples, a strong oil/solvent odor was observed emanating from the wetland area where samples were being obtained. No other ambient odors were detected when not obtaining a sample.

During a site visit in 2006, IDEM staff observed two air vents that had been established near the center of the landfill. The alarms on a Multi-Rae air monitoring instrument were triggered when staff approached the vents. The Rae Systems Multi-Rae instrument monitors oxygen, carbon monoxide, hydrogen sulfide, LEL, and volatile organic compounds. Staff exited the area when this alarm occurred.

Presently, there are no reports of adverse health effects resulting from the migration of hazardous substances through the air at this site. This pathway was not evaluated during this site inspection.

SECTION V
SITE SUMMARY

The Gary Development Landfill was a permitted solid waste landfill that illegally accepted hazardous waste for disposal. The landfill had neither achieved interim status under RCRA nor obtained a RCRA permit. The facility operated from 1975 to 1989. The site is 62 acres total, of which approximately 55 acres were utilized for solid and hazardous waste disposal. The site is now abandoned and the corporation dissolved.

A review of IDEM records showed that uncontrolled and untreated drainage was allowed to discharge directly into the Grand Calumet River when the landfill was active. No NPDES permit was obtained for the offsite discharge.

In 1986, U.S. EPA issued an administrative complaint and compliance order, which alleged that Gary Development Landfill accepted hazardous waste for disposal at their landfill which neither achieved interim status under RCRA, nor obtained a RCRA permit. Gary Development's appeal of this order was dismissed as untimely in August 1996. After negotiation, a consent decree required Gary Development to pay \$86,000 in fines and \$40,000 into a trust fund. However, due to a lack of funds to adequately address closure and post-closure activities at the site, the site was deferred to CERCLA from the RCRA program.

During a routine inspection, IDEM identified several abandoned drums at the site on January 8, 2002. At that time, IDEM notified

U. S. EPA of the situation and a Time Critical Removal Action was conducted at the site. Numerous containers of various substances including oils, paint, insecticides, antifreeze, and electrical capacitors were removed from the site.

On April 16, 2009, IDEM staff conducted an ESI of the site. A total of 20 soil/sediment samples were collected. Numerous semi-volatile organic compounds, metals, various pesticides, and PCBs, were detected, at concentrations three (3) times above background, in the soils/sediments of the wetland area located on the south side of the landfill. These wetlands are known to be used by several state endangered species.

Table 2 Background Concentration Table

(showing highest analyte concentration detected and the 3x background concentration value)

CLP ID#	IDEM ID#	Analyte	Concentration	Qualifier	Adjusted Value	3 X Background Concentration
METALS						
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Chromium (Total)	472 mg/kg			1,416 mg/kg
E2QQ1/ME2QQ1	SDA1 (0-12 in)	Chromium (Total)	185 mg/kg			555 mg/kg
E2QQ1/ME2QQ1	SDA1 (0-12 in)	Zinc	1,020 mg/kg			3,060 mg/kg
E2QQ7/ME2QQ7	SDD1 (0-12 in)	Lead	362 mg/kg			1,086 mg/kg
PCBs						
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Arochlor 1248	25,000 ug/kg			75,000 ug/kg
PESTICIDES						
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	delta-BHC	24 ug/kg	U		72 ug/kg
E2QQ1/ME2QQ1	SDA1 (0-12 in)	beta-BHC	11 ug/kg			33 ug/kg
E2QQ1/ME2QQ1	SDA1 (0-12 in)	Endosulfan I	11 ug/kg			33 ug/kg
SVOCs						
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Acentaphthene	14,000 ug/kg	J	17,000 ug/kg*	51,000 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Anthracene	17,000 ug/kg	U		51,000 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Benzo(a)anthracene	17,000 ug/kg	U		51,000 ug/kg
(E2QQ2\ME2QQ2)	SDC2 (12-24 in)	Benzo(a)pyrene	4,700 ug/kg			14,100 ug/kg
(E2QQ2\ME2QQ2)	SDC2 (12-24 in)	Benzo(b)fluoranthene	7,100 ug/kg			21,300 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Benzo(ghi)perylene	17,000 ug/kg	U		51,000 ug/kg
(E2QQ2\ME2QQ2)	SDC2 (12-24 in)	Benzo(k)fluoranthene	9,000 ug/kg			27,100 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Chrysene	17,000 ug/kg	J	17,000 ug/kg*	51,000 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Dibenzofuran	17,000 ug/kg	U		51,000 ug/kg
(E2QQ2\ME2QQ2)	SDC2 (12-24 in)	Fluoranthene	15,000 ug/kg			45,000 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Fluorene	17,000 ug/kg	U		51,000 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Indeno(1,2,3-cd)pyrene	17,000 ug/kg	U		51,000 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Phenanthrene	17,000 ug/kg	U		51,000 ug/kg
(E2QQ2\ME2QQ2)	SDA2 (12-24 in)	Pyrene	11,000 ug/kg	J	17,000 ug/kg*	51,000 ug/kg
E2QQ1/ME2QQ1	SDA1 (0-12 in)	Fluoranthene	1,700 ug/kg	J	5,300 ug/kg* ²	15,900 ug/kg
E2QQ1/ME2QQ1	SDA1 (0-12 in)	Pyrene	3,300 ug/kg	J	5,300 ug/kg* ²	15,900 ug/kg

* E2QS2 Acenaphthene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QS2 Chrysene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QS2 Pyrene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

*² E2QQ1 Fluoranthene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

*² E2QQ1 Pyrene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

TABLE 3 METALS KEY FINDINGS

Sample ID	Sample Type	Date	Hazardous Substance	Background Concentration* (Adjusted Concentration)	Hazardous Substance Concentration (Adjusted Concentration)	Dilution Factor
ME2QR3	Sediment	5/5/09	Chromium Iron	185 mg/Kg 79,000 mg/Kg	1,580 mg/Kg (J) (1,225 mg/Kg)* 262,000 mg/Kg	1x
ME2QR9	Sediment	5/5/09	Chromium Iron Lead Zinc	185 mg/Kg 79,000 mg/Kg 362 mg/Kg 1,020 mg/Kg	1,720 mg/Kg (J) (1,333 mg/Kg)* 242,000 mg/Kg 1,740 mg/Kg 6,340 mg/Kg	1x
ME2QS0	Sediment	5/5/09	Chromium	472 mg/Kg (J) (472 mg/Kg)*	2,030 mg/Kg (J) (1,574 mg/Kg)*	1x

* The background concentration used for Potassium in samples ME2QR1, ME2QR3, ME2QR9, and ME2QS1 were derived from background sample ME2QQ1. The background concentration used for Potassium in samples ME2QR2, and ME2QR4 were derived from background sample ME2QQ8. The background concentration used for Chromium in samples ME2QR3, and ME2QR9 was derived from background sample ME2QQ1. The background concentration used for Chromium in sample ME2QS0 was derived from background sample ME2QQ2. The background concentration used for Iron in samples ME2QR3 and ME2QR9 were derived from background sample ME2QQ1. The background concentration used for Magnesium in samples ME2QR5 and ME2QR7 were derived from background sample ME2QQ1. The background concentration used for Lead in sample ME2QR9 was derived from background sample ME2QQ7. The background concentration used for Zinc in sample ME2QR9 was derived from background sample ME2QQ1.

(J) The concentration is estimated

* ME2QR3 Chromium Result Biased High and adjusted using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* ME2QR9 Chromium Result Biased High and adjusted using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* ME2QS0 Chromium Background Concentration was not adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* ME2QS0 Chromium Result Biased High and adjusted using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996

Sample ID	Sample Type	Date	Hazardous Substance	Background Concentration* (Adjusted Concentration)	Hazardous Substance Concentration (Adjusted Concentration)	Dilution Factor
E2QS2	Sediment	5/5/09	Acenaphthene Anthracene Benzo(a)Anthracene Benzo(a)Pyrene Benzo(b)Fluoranthene Benzo(g,h,i)Perylene Benzo(k)Fluoranthene Chrysene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)Pyrene Phenanthrene Pyrene	14,000 ug/Kg (J) (17,000 ug/Kg) * 17,000 ug/Kg 17,000 ug/Kg 4,700 ug/Kg 7,100 ug/Kg 17,000 ug/Kg 5,700 ug/Kg 9,000 ug/Kg (J) (17,000 ug/Kg) * 17,000 ug/Kg 15,000 ug/Kg 17,000 ug/Kg 17,000 ug/Kg 17,000 ug/Kg 11,000 ug/Kg (J) (17,000ug/Kg) *	480,000 ug/Kg 270,000 ug/Kg 600,000 ug/Kg 540,000 ug/Kg 700,000 ug/Kg 130,000 ug/Kg (J) (130,000 ug/Kg)* 500,000 ug/Kg 630,000 ug/Kg 220,000 ug/Kg (J) (220,000 ug/Kg)* 2,000,000 ug/Kg 440,000 ug/Kg 160,000 ug/Kg (J) (160,000ug/Kg)* 460,000 ug/Kg 1,100,000 ug/Kg	20x

* Background concentrations used in sample E2QR3 were derived from background sample E2QQ1. Background concentrations used in sample E2QS2 were derived from background sample E2QQ2 except for Benzo(a)Pyrene, Benzo(b)Fluoranthene, Benzo(k)Fluoranthene, and Fluoranthene that were derived from background sample E2QQ6.

(J) The concentration is estimated

* E2QS2 Acenaphthene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QS2 Chrysene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QS2 Pyrene Background Concentration was adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QS2 Benzo(g,h,i)Perylene Concentration was not adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QS2 Dibenzofuran Concentration was not adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QS2 Indeno(1,2,3-cd)Pyrene Concentration was not adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

TABLE 5 PESTICIDES KEY FINDINGS

Sample	Sample Type	Date	Hazardous Substance	Background Concentration* (Adjusted Concentration)	Hazardous Substance Concentration (Adjusted Concentration)	Dilution Factor
E2QR3	Sediment	5/5/09	beta-BHC Endosulfan I	11 ug/Kg 9 ug/Kg (J) (11 ug/Kg) *	52 ug/Kg (J) (52 ug/Kg) * 38 ug/Kg (J) (38 ug/Kg) *	10x Dilution
E2QS2	Sediment	5/5/09	delta-BHC	24 ug/Kg	450 ug/Kg	10x Dilution

* Background concentrations used in sample E2QR3 was derived from background sample E2QQ1. Background concentration used in sample E2QS2 was derived from background sample E2QQ2.

(J) The concentration is estimated

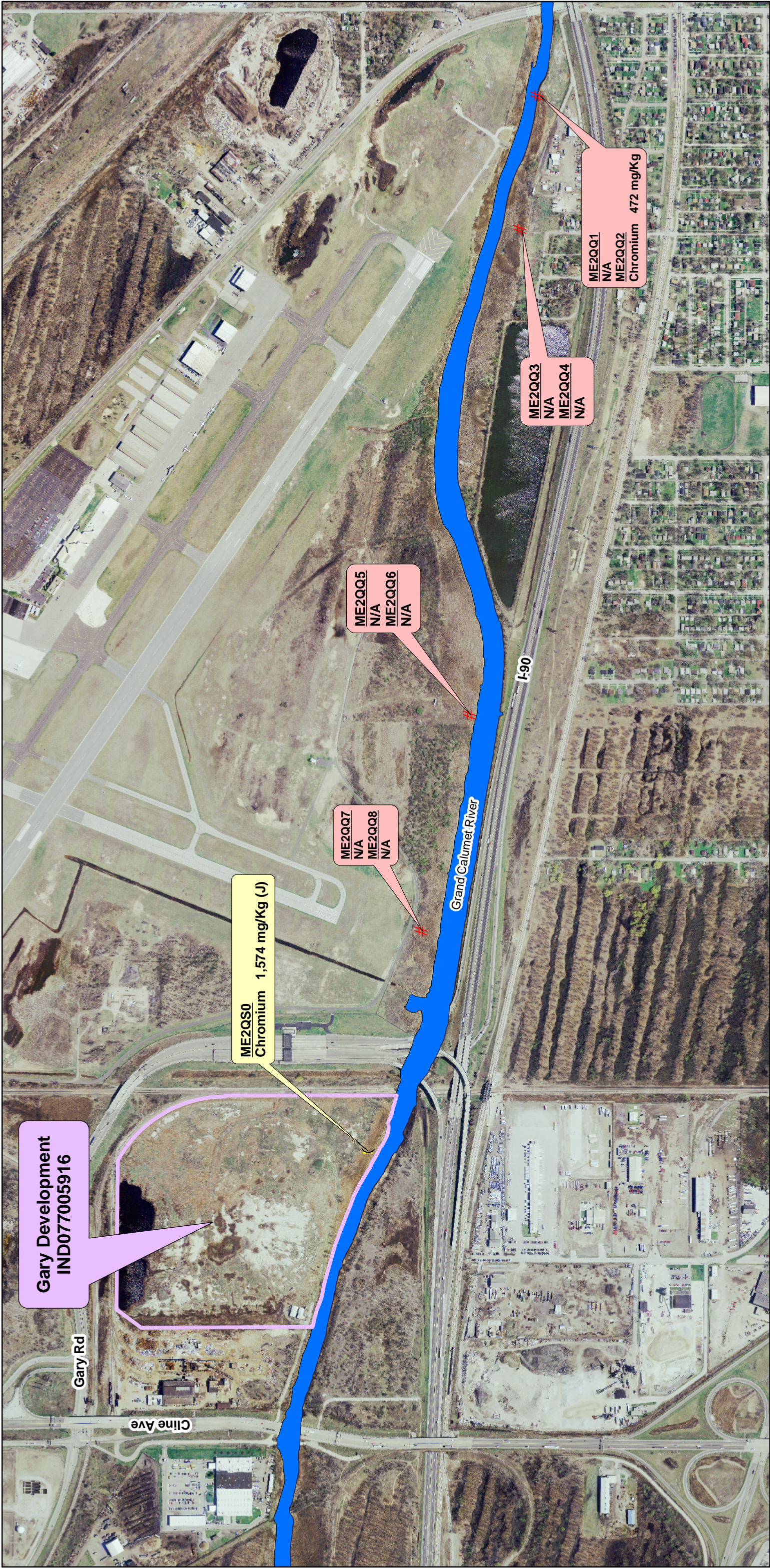
* E2QR3 endosulfan I Background Result was adjusted using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QR3 beta-BHC Concentration was not adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

* E2QR3 endosulfan I Concentration was not adjusted when using the procedure described in EPA 540-F-94-028, *Using Qualified Data to Document an Observed Release and Observed Contamination*, November 1996.

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Metals Key Findings Map, Gary Development Landfill
Gary, Lake County, Indiana (U.S. EPA ID: IND077005916)



Results based on comparison of the 0" - 24" interval to the 0" - 24" background interval.

Sources:
Non Orthophotography Data
- Obtained from the State of Indiana Geographic Information Office Library
- Sediment samples collected May 5, 2009
Orthophotography - Obtained from IndianaMap Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N **Map Datum:** NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.
Mapped By:Mike Hill, Office of Land Quality
Date:5/24/2010



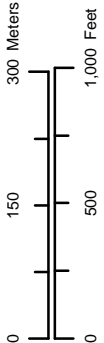
(Metals - Key Findings Sample Location
Background Sample Location
Approximate Site Boundary
Grand Calumet River

N/A = Not Applicable (Metals analytical results were not found to be the highest background concentrations at this location, for this sample).

Site Vicinity

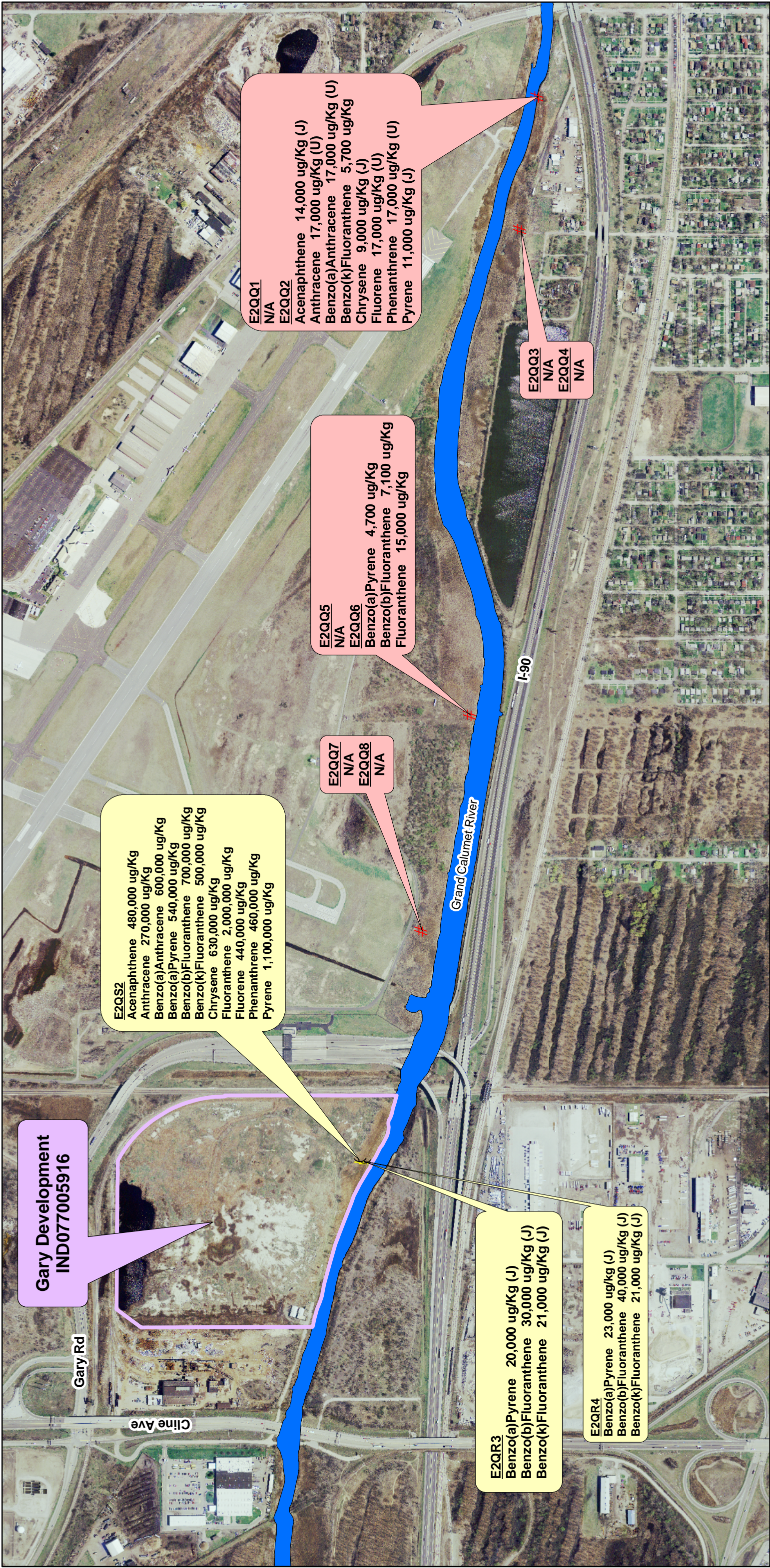
Indiana
Lake County

Lake County, IN



u

SVOCs Key Findings Map, Gary Development Landfill
Gary, Lake County, Indiana (U.S. EPA ID: IND077005916)



DATA QUALIFIER DEFINITIONS
-For the qualifier "J": The result is an estimated quantity.
The associated numerical value is the approximate concentration of the analyte in the sample.
-For the qualifier "U": The analyte was analyzed for, but it was not detected above the reported sample quantitation limit.

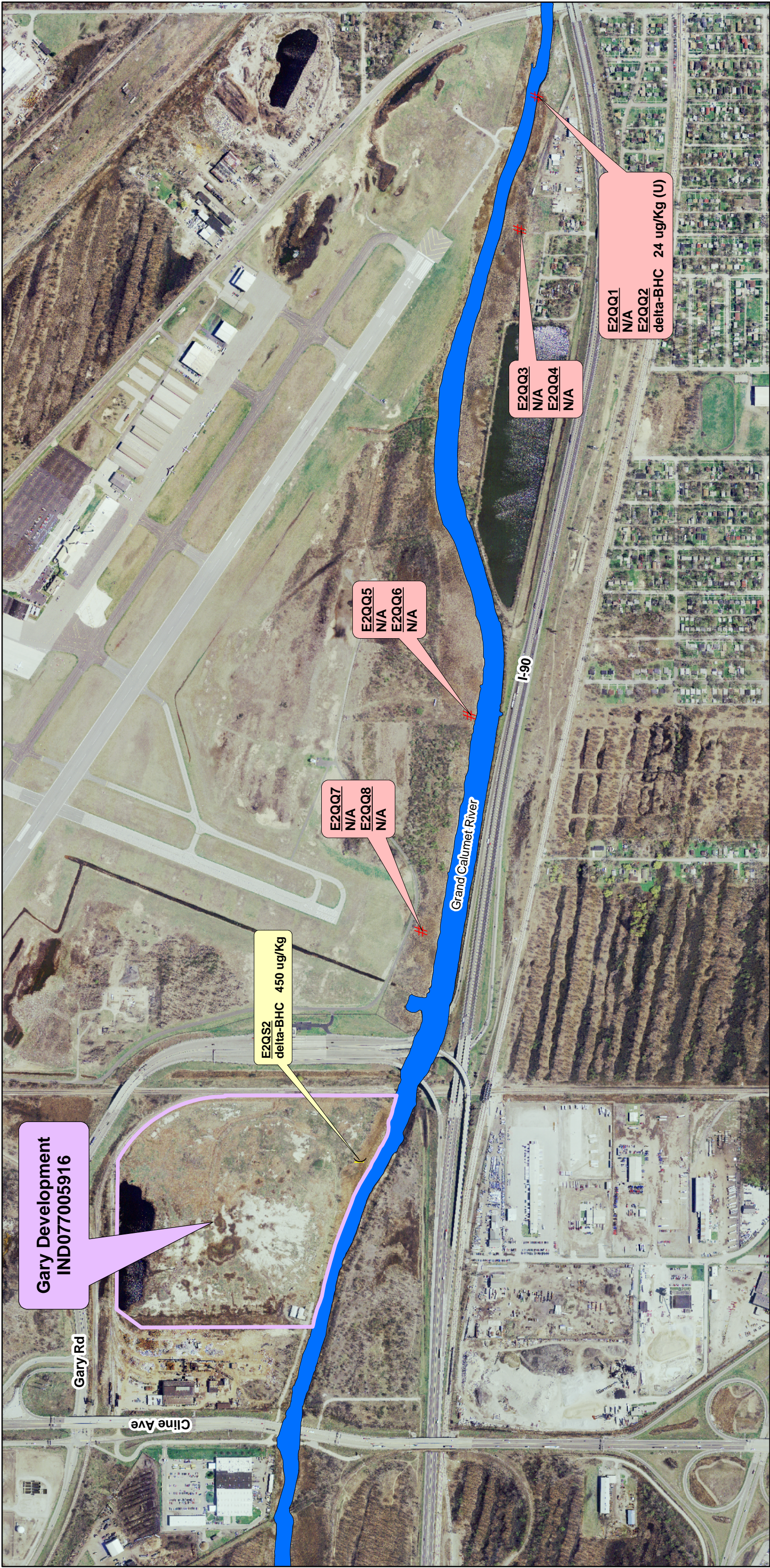
Sources:
Non Orthophotography Data
- Obtained from the State of Indiana Geographic Information Office Library
- Sediment samples collected May 5, 2009
Orthophotography - Obtained from IndianaMap Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N Map Datum: NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.
Mapped By: Mike Hill, Office of Land Quality
Date: 3/29/2010



N/A = Not Applicable (SVOCs analytical results were not found to be the highest background concentrations at this location, for this sample).

Pesticides Key Findings Map, Gary Development Landfill
Gary, Lake County, Indiana (U.S. EPA ID: IND077005916)



Results based on comparison of the 0" - 24" interval to the 0" - 24" background interval.

Sources:
Non Orthophotography Data
- Obtained from the State of Indiana Geographic Information Office Library
- Sediment samples collected May 5, 2009
Orthophotography - Obtained from IndianaMap Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N Map Datum: NAD83

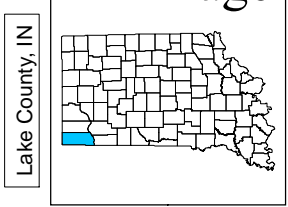
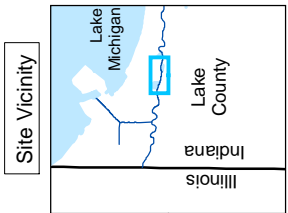
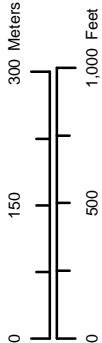
This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.
Mapped By: Mike Hill, Office of Land Quality
Date: 5/24/2010



Legend:

- () Pesticides - Key Findings Sample Location
- # Background Sample Location
- Approximate Site Boundary
- Grand Calumet River

N/A = Not Applicable (Pesticides analytical results were not found to be the highest background concentrations at this location, for this sample).



PCBs Key Findings Map, Gary Development Landfill
Gary, Lake County, Indiana (U.S. EPA ID: IND077005916)



Results based on comparison of the 0" - 24" interval to the 0" - 24" background interval.

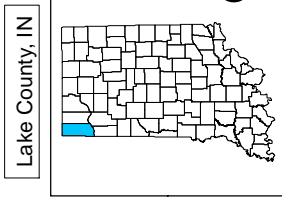
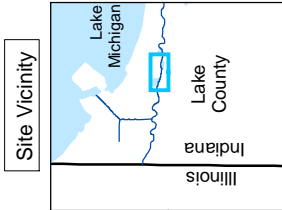
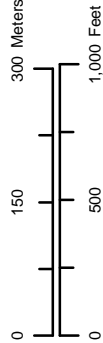
Sources:
Non Orthophotography Data
- Obtained from the State of Indiana Geographic Information Office Library
- Sediment samples collected May 5, 2009
Orthophotography - Obtained from IndianaMap Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N Map Datum: NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.
Mapped By: Mike Hill, Office of Land Quality
Date: 7/14/2010

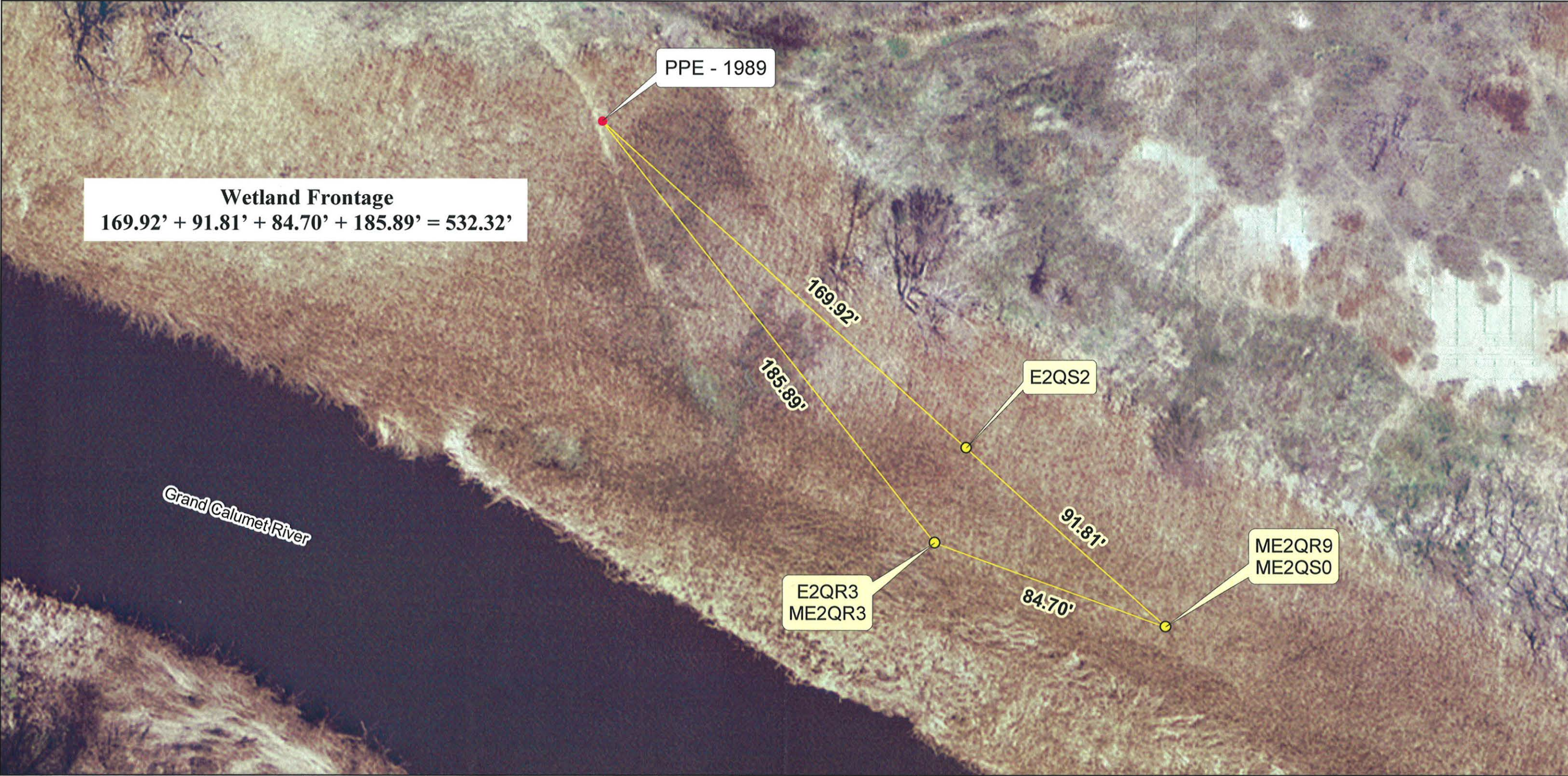


PCBs - Key Findings Sample Location
Background Sample Location
Approximate Site Boundary
Grand Calumet River

N/A = Not Applicable (PCBs analytical results were not found to be the highest background concentrations at this location, for this sample).



Wetland Frontage Map, Gary Development Landfill
Gary, Lake County, Indiana (U.S. EPA ID: IND077005916)



Contaminated Area:
.0955 acres
4,159.98 square feet

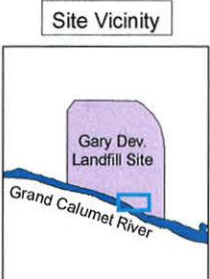
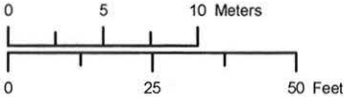
Sources:
Non Orthophotography Data
- Unpermitted Discharge Point location obtained from the State Land Office, 1989 Digital Aerial Photography
Orthophotography - Obtained from IndianaMap Framework Data (2005 Digital Orthophotography)
(www.indianamap.org)
Map Projection: UTM Zone 16 N Map Datum: NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Mapped By: Mike Hill, Office of Land Quality
Date: 5/25/2010



● Probable Point of Entry (PPE) - 1989
● Sediment Sample Location
Sediment Sample Delineation



Appendix A
IDEM Site Photographs



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 3:30 PM
EPA SAMPLE ID: E2QQ8 & ME2QQ8
IDEM SAMPLE ID: SDD2
COMMENTS: Sediment sample obtained from southwest corner of airport property –
12-24" depth inundated



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09 **TIME:** 3:15 PM

EPA SAMPLE ID: E2QQ7 & ME2QQ7

IDEM SAMPLE ID: SDD1

COMMENTS: Sediment sample obtained from southwest corner of airport property –
0-12" depth inundated



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 2:35 PM

EPA SAMPLE ID: E2QQ6 & ME2QQ6

IDEM SAMPLE ID: SDC2

COMMENTS: Picture shows the area where sample E2QQ6 and ME2QQ6 were taken



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09 **TIME:** 2:35 PM

EPA SAMPLE ID: E2QQ6 & ME2QQ6

IDEM SAMPLE ID: SDC2

COMMENTS: Sediment sample taken from 100 yards south southwest of Gary Airport billboard; north bank of Grand Calumet River – 12-24” deep inundated



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 2:20 PM

EPA SAMPLE ID: E2QQ5 & ME2QQ5

IDEM SAMPLE ID: SDC1

COMMENTS: Picture shows the area where sample E2QQ5 and ME2QQ5 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 2:20 PM

EPA SAMPLE ID: E2QQ5 & ME2QQ5

IDEM SAMPLE ID: SDC1

COMMENTS: Sediment sample taken from 100 yards south southwest of Gary Airport billboard; north bank of Grand Calumet River – 0-12” deep



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 12:42 PM

EPA SAMPLE ID: E2QQ4 & ME2QQ4

IDEM SAMPLE ID: SDB2

COMMENTS: Picture shows the area where sample E2QQ4 and ME2QQ4 were obtained



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 12:42 PM

EPA SAMPLE ID: E2QQ4 & ME2QQ4

IDEM SAMPLE ID: SDB2

COMMENTS: Sediment sample taken from intersection of Durbin Street and Riverside Drive; south side of river – 12-24" deep inundated



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 12:30 PM

EPA SAMPLE ID: E2QQ3 & ME2QQ3

IDEM SAMPLE ID: SDB1

COMMENTS: Picture shows the area where sample E2QQ3 and ME2QQ3 were obtained



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 12:30 PM

EPA SAMPLE ID: E2QQ3 & ME2QQ3

IDEM SAMPLE ID: SDB1

COMMENTS: Sediment sample taken from intersection of Durbin Street and Riverside Drive; south side of river – 0-12” deep inundated



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 11:40 AM

EPA SAMPLE ID: E2QQ2 & ME2QQ2

IDEM SAMPLE ID: SDA2

COMMENTS: Picture shows the area where sample E2QQ2 and ME2QQ2 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 11:40 AM

EPA SAMPLE ID: E2QQ2 & ME2QQ2

IDEM SAMPLE ID: SDA2

COMMENTS: Sediment sample taken from 60' west of strobe light at east end of Gary Airport runway – 12-24" deep inundated



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 11:25 AM

EPA SAMPLE ID: E2QQ1 & ME2QQ1

IDEM SAMPLE ID: SDA1

COMMENTS: Picture shows the area where sample E2QQ1 and ME2QQ1 were obtained



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09 **TIME:** 11:25 AM
EPA SAMPLE ID: E2QQ1 & ME2QQ1
IDEM SAMPLE ID: SDA1
COMMENTS: Sediment sample taken from 60' west of strobe light at east end of Gary
Airport runway – 0-12" deep



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 4:21 PM

EPA SAMPLE ID: E2QS2 & ME2QS2

IDEM SAMPLE ID: SDJ2

COMMENTS: Sediment sample taken from south grouping of trees past end of the road
– 12-24" deep



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 4:11 PM

EPA SAMPLE ID: E2QS1 & ME2QS1

IDEM SAMPLE ID: SDJ1

COMMENTS: Picture shows the area where sample E2QS1 and ME2QS1 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 4:11 PM

EPA SAMPLE ID: E2QS1 & ME2QS1

IDEM SAMPLE ID: SDJ1

COMMENTS: Sediment sample taken from south of first grouping of trees past the end of the road – 0-12” deep



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 3:35 PM

EPA SAMPLE ID: E2QS0 & ME2QS0

IDEM SAMPLE ID: SDI2

COMMENTS: Picture shows the area where sample E2QS0 and ME2QS were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 3:35 PM

EPA SAMPLE ID: E2QS0 & ME2QS0

IDEM SAMPLE ID: SDI2

COMMENTS: Sediment sample taken from southeast of first grouping of trees past the end of the road – 12-24" depth; inundated



GARY DEVELOPMENT, INC.

GARY, INDIANA

U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 3:25 PM

EPA SAMPLE ID: E2QR9 & ME2QR9

IDEM SAMPLE ID: SDI1

COMMENTS: Picture shows the area where sample E2QR9 and ME2R9 were obtained



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 3:25 PM

EPA SAMPLE ID: E2QR9 & ME2QR9

IDEM SAMPLE ID: SDI1

COMMENTS: Sediment sample taken from southeast of first grouping of trees past the end of the road – 0-12” depth; inundated



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 4:21 PM

EPA SAMPLE ID: E2QS2 & ME2QS2

IDEM SAMPLE ID: SDJ2

COMMENTS: Picture shows the area where sample E2QR9 and ME2R9 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 11:39 AM
EPA SAMPLE ID: E2QR1 & ME2QR1
IDEM SAMPLE ID: SDE1
COMMENTS: Picture shows the area where sample E2QR1 and ME2R1 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 11:39 AM

EPA SAMPLE ID: E2QR1 & ME2QR1

IDEM SAMPLE ID: SDJ2

COMMENTS: Sediment sample taken from south of first grouping of trees past the end of the road; over halfway to the river – 0-12" depth; inundated





GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 2:20 PM

EPA SAMPLE ID: E2QR8 & ME2QR8

IDEM SAMPLE ID: SDH2

COMMENTS: Picture shows the area where sample E2QR8 and ME2R8 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 2:20 PM

EPA SAMPLE ID: E2QR8 & ME2QR8

IDEM SAMPLE ID: SDH2

COMMENTS: Sediment sample taken from westernmost sample location;
approximately between the road and river – 12-24" depth; inundated



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 2:00 PM

EPA SAMPLE ID: E2QR7 & ME2QR7

IDEM SAMPLE ID: SDH1

COMMENTS: Picture shows the area where sample E2QR7 and ME2R7 were obtained



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09 **TIME:** 2:00 PM

EPA SAMPLE ID: E2QR7 & ME2QR7

IDEM SAMPLE ID: SDH1

COMMENTS: Sediment sample taken from westernmost sample location;
approximately between the road and river – 0-12" depth; inundated



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 1:20 PM

EPA SAMPLE ID: E2QR6 & ME2QR6

IDEM SAMPLE ID: SDG2

COMMENTS: Picture shows the area where sample E2QR6 and ME2R6 were obtained



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 1:20 PM

EPA SAMPLE ID: E2QR6 & ME2QR6

IDEM SAMPLE ID: SDG2

COMMENTS: Sediment sample taken from nearly the east and west center of phragmites field area, halfway between the road and the river -12-24" depth



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 1:1 PM

EPA SAMPLE ID: E2QR5& ME2QR5

IDEM SAMPLE ID: SDG1

COMMENTS: Picture shows the area where sample E2QR5and ME2R5were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 1:10 PM

EPA SAMPLE ID: E2QR5 & ME2QR5

IDEM SAMPLE ID: SDG1

COMMENTS: Sediment sample taken from nearly the east and west center of phragmites field area, halfway between the road and the river - 0-12" depth



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 12:05 PM

EPA SAMPLE ID: E2QR4 & ME2QR4

IDEM SAMPLE ID: SDF2

COMMENTS: Sediment sample taken from south of first grouping of trees past end of the road, over halfway to the river – 12-24" depth



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 12:05 PM

EPA SAMPLE ID: E2QR4& ME2QR4

IDEM SAMPLE ID: SDF2

COMMENTS: Picture shows the area where sample E2QR4and ME2R4 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 11:40 AM
EPA SAMPLE ID: E2QR2& ME2QR2
IDEM SAMPLE ID: SDE2
COMMENTS: Picture shows the area where sample E2QR2and ME2R2 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09

TIME: 11:40 AM

EPA SAMPLE ID: E2QR2 & ME2QR2

IDEM SAMPLE ID: SDE2

COMMENTS: Sediment sample taken from south of first grouping of trees past end of the road, over halfway to the river – 0-12" depth



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

TIME: 12:03 PM

EPA SAMPLE ID: E2QR3 & ME2QR3

IDEM SAMPLE ID: SDF1

COMMENTS: Picture shows the area where sample E2QR2 and ME2R2 were obtained



GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916

DATE: 5/5/09 **TIME:** 12:03 PM

EPA SAMPLE ID: E2QR3 & ME2QR3

IDEM SAMPLE ID: SDF1

COMMENTS: Sediment sample taken from south of first grouping of trees past end of the road, over halfway to the river – 12-24" depth



**GARY DEVELOPMENT, INC.
GARY, INDIANA
U.S. EPA ID# IND077005916**

DATE: 5/5/09

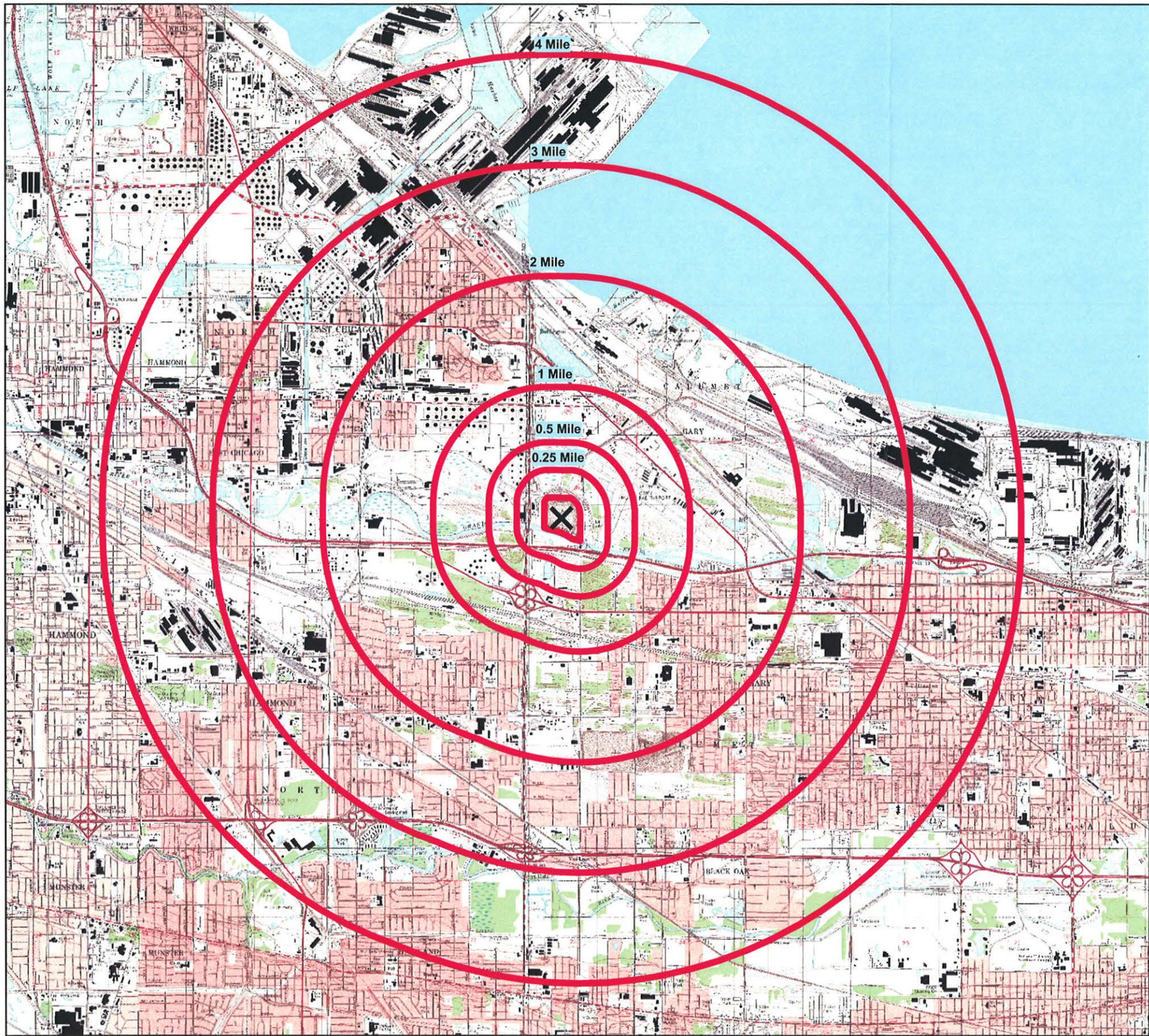
TIME: 3:30 PM

EPA SAMPLE ID: E2QQ8 & ME2QQ8

IDEM SAMPLE ID: SDD2

COMMENTS: Picture shows the area where samples E2QQ8 and ME2QQ8 were obtained

Appendix B
4-Mile Radius Map



Four Mile Radius Map Gary Development Landfill Gary, Lake County, IN U.S. EPA ID: IND077005916

Buffer Distance	Adjusted Population
0.25 Mile	187
0.5 Mile	473
1 Mile	1722
2 Mile	19255
3 Mile	33638
4 Mile	36832
Total Adjusted Population	92107

Mapped by: Mike Hill, Office of Land Quality, Engineering & GIS Services, September 30, 2009

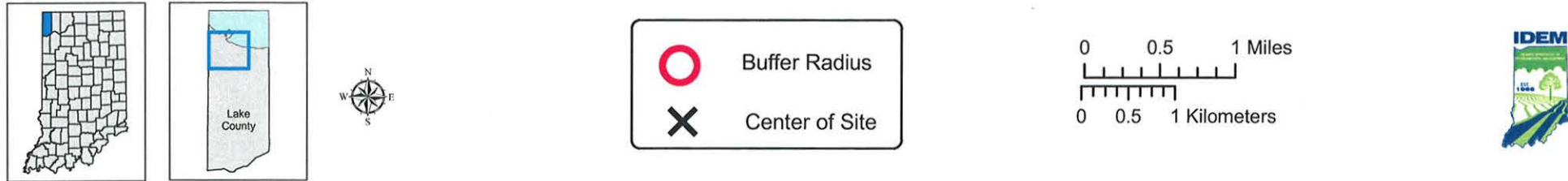
Sources:
IDEM 4 Mile Mapper Application
Indiana Geographic Information Office Data Library
Digital USGS Digital Raster Graphics 1:24,000 Topographic Map
Census Block Group 2006 (total population)

Disclaimer: This map does not represent a legal document. It is intended to serve as an aid in graphic representation only. It is not warranted for accuracy or suitability for any purpose. There are known sources of error in the population estimates presented on this map including:

- The Census 2006 block group population data is out of date, and is itself an imperfect estimate of population.
- The adjusted population estimate derived from the Census 2006 block group data assumes that the population is evenly distributed in each block group polygon. Due to this assumption, the adjusted population for the quarter mile buffer distance is assumed to be zero.
- The Census 2006 block group population has been clipped to include Indiana data only.

Method of Estimating Population: The adjusted population estimate is the sum of Census 2006 block group populations (TOTALPOP field) adjusted to include only the areas of the block groups contained inside the buffers. The adjusted population estimate assumes that the population is evenly distributed in each block group polygon. The specific procedure used in this analysis is as follows:

- The study area or site is drawn on screen by the user. The study area can be 1 or more polygons.
- The user selects the polygon(s) to include in the population estimate, and clicks a button to perform the rest of the analysis which is described in the following steps.
- The study area polygon(s) are buffered at .0001, 1/4, 1/2, 1, 2, 3 and 4 miles. The buffers are stored as polygons in a shapefile. In analyses with more than one study area polygon, intersecting buffers are dissolved to prevent overlapping buffers of the same buffer distance. This is necessary to prevent counting the population more than once in areas where buffers overlap.
- A spatial union is performed on the block group layer and the buffers layer resulting in a new layer containing polygons reflecting the combined geography of the block groups and the buffers. The new polygons inherit the attributes of the parent polygons from the block groups and buffers layers, including the population and area of the parent block group polygon. The area of the new polygons is not calculated automatically during the union.
- The geographic area of each new polygon is determined through a field calculation using a piece of visual basic code. See ArcGIS Help for a discussion of this process including the code.
- Following step 5, each new polygon has an attribute record containing the geographic area of the new polygon, the geographic area of the parent block group, and the TOTALPOP field population value from the parent block group. Dividing the area of the new polygon by the area of the parent block group and multiplying that value by the population yields a population estimate for each new polygon. For example: Block Group A with an area of 10 square miles and a population of 200 people is split into 2 polygons by the 4 mile buffer ring. The area of the block group inside the 4 mile buffer is 2 square miles, or 20% of the area of the original 10 square mile block group. Assuming the population is uniformly distributed in Block Group A, the population from Block Group A that is within the 4 mile buffer ring should also be 20% of the total population for the block group. Twenty percent of 200 is 40 people. (2 + 10 x 200 = 40)
- The new population figures from step 6 are automatically summed and compiled into a table that is displayed on the print layout. The automatic summing process completed by the 4 Mile Mapper application produces population estimates that include the entire population from the site out to each buffer distance (e.g. 0 to 0.25, 0 to 0.50, 0 to 1, 0 to 2...). The map author manually recalculates these figures by taking the population for each buffer distance and subtracting the population of the next smaller buffer distance to provide a population figure for the donut area bounded by each pair of consecutive buffer distances (e.g. 0 to 0.25, 0.25 to 0.5, 0.5 to 1, 1 to 2...). The population table is labeled and revised to reflect these values, and a total population figure is added to reflect the population from the site out to the 4 mile buffer distance.



This map was created using 4 Mile Mapper v1.0.0, a customized application developed in ArcGIS v9.1 in the Office of Land Quality, Science Services Branch, Engineering and GIS Section by Mr. Raju Gopin, Indiana Governor's Public Service Intern. 4 Mile Mapper v1.0.0 was created during the Summer of 2004.

Appendix C
Sensitive Environment Information

DNR

Indiana Department of Natural Resources

RECEIVED
SEP 16 2009
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
OFFICE OF LAND QUALITY

September 15, 2009

Mr. Mark Jaworski
Site Investigation Section
Office of Land Quality
Indiana Dept. of Environmental Management

Dear Mr. Jaworski:

I am responding to your request for information on the endangered, threatened, or rare (ETR) species, high quality natural communities, and natural areas documented within 4 miles of the Gary Development Landfill, Lake County, Indiana. The Indiana Natural Heritage Data Center has been checked and enclosed you will find information on the ETR species documented within 4 miles of the project area.

For more information on the animal species mentioned, please contact Christie Stanifer, Environmental Coordinator, Division of Water, 402 W. Washington Room W264, Indianapolis, Indiana 46204, (317)232-4160.

The information I am providing does not preclude the requirement for further consultation with the U.S. Fish and Wildlife Service as required under Section 7 of the Endangered Species Act of 1973. If you have concerns about potential Endangered Species Act issues you should contact the Service at their Bloomington, Indiana office.

U.S. Fish and Wildlife Service
620 South Walker St.
Bloomington, Indiana 47403-2121
812)334-4261

At some point, you may need to contact the Department of Natural Resources' Environmental Review Coordinator so that other divisions within the department have the opportunity to review your proposal. For more information, please contact:

Department of Natural Resources
attn: Christie Stanifer
Environmental Coordinator
Division of Water
402 W. Washington Street, Room W264
Indianapolis, IN 46204
(317)232-4160

Mark Jaworski

2

September 15, 2009

Please note that the Indiana Natural Heritage Data Center relies on the observations of many individuals for our data. In most cases, the information is not the result of comprehensive field surveys conducted at particular sites. Therefore, our statement that there are no documented significant natural features at a site should not be interpreted to mean that the site does not support special plants or animals.

Due to the dynamic nature and sensitivity of the data, this information should not be used for any project other than that for which it was originally intended. It may be necessary for you to request updated material from us in order to base your planning decisions on the most current information.

Thank you for contacting the Indiana Natural Heritage Data Center. You may reach me at (317)232-8059 if you have any questions or need additional information.

Sincerely,

Ronald P. Hellmich

Ronald P. Hellmich
Indiana Natural Heritage Data Center

Attachments Data sheet (15 pages)
 Map

ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
1					
Bird	Falco peregrinus	Peregrine Falcon		SE	2009-05-27
2					
Bird	Ardea alba	Great Egret		SSC	2008-05-28
3					
Bird	Nycticorax nycticorax	Black-crowned Night-heron		SE	2008-05-28
Bird	Nycticorax nycticorax	Black-crowned Night-heron		SE	2008-05-28
4					
Bird	Falco peregrinus	Peregrine Falcon		SE	2009-04-28
5					
Bird	Falco peregrinus	Peregrine Falcon		SE	2009-04-28
6					
Vascular Plant	Buchnera americana	Bluehearts		SE	1907-07-28
Vascular Plant	Cirsium pitcheri	Dune Thistle	LT	ST	1916-08-05
Vascular Plant	Lathyrus maritimus var. glaber	Beach Peavine		SE	1907-07-29
Vascular Plant	Satureja glabella var. angustifolia	Calamint		SE	1907-07
Vascular Plant	Juniperus communis	Ground Juniper		SR	1907-07-28
Vascular Plant	Salix cordata	Heartleaf Willow		ST	1908-07-26
Vascular Plant	Carex crawei	Crawe Sedge		ST	1903-06
Vascular Plant	Arenaria stricta	Michaux's Stitchwort		SR	1907-07-28
Vascular Plant	Equisetum variegatum	Variegated Horsetail		SE	1902-06-11
Vascular Plant	Potentilla anserina	Silverweed		ST	1906-08
7					
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	2001-08-06
Vascular Plant	Platanthera hyperborea	Leafy Northern Green Orchis		ST	1994-06-30
Vascular Plant	Satureja glabella var. angustifolia	Calamint		SE	2001-07-19
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1987-12-31
Vascular Plant	Eleocharis geniculata	Capitate Spike-rush		ST	1975-10
Vascular Plant	Carex crawei	Crawe Sedge		ST	1994-06-30
Vascular Plant	Rhus aromatica var. arenaria	Beach Sumac		SR	2001-08-06
8					
Vascular Plant	Rhus aromatica var. arenaria	Beach Sumac		SR	1994-06-30
9					
Vascular Plant	Platanthera hookeri	Hooker Orchis		SX	1897-06
Vascular Plant	Tofieldia glutinosa	False Asphodel		SR	1906-09-23
Vascular Plant	Orobancha fasciculata	Clustered Broomrape		SE	1889-06-08
Vascular Plant	Cirsium pitcheri	Dune Thistle	LT	ST	1882-01-12
Vascular Plant	Utricularia resupinata	Northeastern Bladderwort		SE	1890-08-29
Vascular Plant	Utricularia cornuta	Horned Bladderwort		ST	1910-06-25
Vascular Plant	Solidago simplex var. gillmanii	Sticky Goldenrod		ST	1907-09-08
Vascular Plant	Utricularia minor	Lesser Bladderwort		ST	1889-08
Vascular Plant	Utricularia purpurea	Purple Bladderwort		SR	1907-09-08
Vascular Plant	Rhus aromatica var. arenaria	Beach Sumac		SR	1904-06-04
Vascular Plant	Carex aurea	Golden-fruited Sedge		SR	1899-06-18

Fed: LE = listed federal endangered; LT = listed federal threatened, C = federal candidate species

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SG = state significant; WL = watch list; no rank = not ranked but tracked to monitor status

ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	Cypripedium candidum	Small White Lady's-slipper		WL	1889-05-25
Vascular Plant	Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slipper		SR	1899-06-08
Vascular Plant	Buchnera americana	Bluehearts		SE	1906-07-24
10					
Bird	Falco peregrinus	Peregrine Falcon		SE	2009-03-28
11					
Vascular Plant	Satureja glabella var. angustifolia	Calamint		SE	2001-07-19
12					
Vascular Plant	Rhus aromatica var. arenaria	Beach Sumac		SR	1991-08-12
Vascular Plant	Carex aurea	Golden-fruited Sedge		SR	1991-06-13
Bird	Cistothorus palustris	Marsh Wren		SE	1991-06-12
Vascular Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses		SE	1990-09-27
Vascular Plant	Arctostaphylos uva-ursi	Bearberry		SR	1991-08-12
High Quality Natural C	Prairie - sand dry	Dry Sand Prairie		SG	1978-07-12
Vascular Plant	Buchnera americana	Bluehearts		SE	1991-08-12
Vascular Plant	Aster borealis	Rushlike Aster		SR	1985-07-10
Vascular Plant	Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slipper		SR	1987-05-20
Vascular Plant	Carex eburnea	Ebony Sedge		SR	1985-07-10
Vascular Plant	Satureja glabella var. angustifolia	Calamint		SE	1978-07
Vascular Plant	Cypripedium candidum	Small White Lady's-slipper		WL	1985-07-10
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07-12
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1991-08-12
Vascular Plant	Juncus balticus var. littoralis	Baltic Rush		SR	1991-08-13
Vascular Plant	Carex richardsonii	Richardson Sedge		ST	1986-04-29
Vascular Plant	Thuja occidentalis	Northern White Cedar		SE	1978-07-12
High Quality Natural C	Wetland - panne	Panne		SG	1978-08
Vascular Plant	Pinus banksiana	Jack Pine		SR	1985-07-10
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07
13					
Vascular Plant	Rhus aromatica var. arenaria	Beach Sumac		SR	1995-12-28
Vascular Plant	Thuja occidentalis	Northern White Cedar		SE	1978-07-12
High Quality Natural C	Prairie - sand dry	Dry Sand Prairie		SG	1978-07-12
Vascular Plant	Arctostaphylos uva-ursi	Bearberry		SR	1978-07
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07-12
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1995-12-28
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07-12
High Quality Natural C	Prairie - sand wet	Wet Sand Prairie		SG	1978-07-12
14					
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1995-12-28
15					
Vascular Plant	Sisyrinchium montanum	Strict Blue-eyed-grass		SE	1980-06
Vascular Plant	Eleocharis geniculata	Capitate Spike-rush		ST	1985-07-10
Vascular Plant	Geranium bicknellii	Bicknell Northern Crane's-bill		SE	1903-06-15
Vascular Plant	Aristida intermedia	Slim-spike Three-awn Grass		SR	1980-09-24
Vascular Plant	Carex crawei	Crawe Sedge		ST	1991-06-13
Vascular Plant	Carex garberi	Elk Sedge		ST	1991-06-13
16					

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	2007-07-12
17					
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	2007-06-18
Insect Lepidoptera	<i>Hesperia ottoe</i>	Ottoe Skipper		SE	1995-06-28
18					
Vascular Plant	<i>Buchnera americana</i>	Bluehearts		SE	1991-08-29
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	1991-08-29
Vascular Plant	<i>Buchnera americana</i>	Bluehearts		SE	1991-08-29
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-29
19					
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1991-08-13
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1991-06-12
Reptile	<i>Clemmys guttata</i>	Spotted Turtle		SE	1991-04-18
Vascular Plant	<i>Carex eburnea</i>	Ebony Sedge		SR	1991-08-13
Vascular Plant	<i>Aristida intermedia</i>	Slim-spike Three-awn Grass		SR	1991-08-13
Vascular Plant	<i>Pinus banksiana</i>	Jack Pine		SR	1991-08-13
Vascular Plant	<i>Eleocharis geniculata</i>	Capitate Spike-rush		ST	1991-08-13
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	1991-08-13
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1991-08-13
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	1991-08-13
Vascular Plant	<i>Tofieldia glutinosa</i>	False Asphodel		SR	1991-08-13
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-13
Vascular Plant	<i>Carex garberi</i>	Elk Sedge		ST	1991-08-13
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	1991-08-13
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1991-08-13
20					
Vascular Plant	<i>Arenaria stricta</i>	Michaux's Stitchwort		SR	1946-06-14
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1916-08-26
21					
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	1995-09-21
Vascular Plant	<i>Carex eburnea</i>	Ebony Sedge		SR	1995-06-02
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1995-06-02
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1995-09-21
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	1995-07-26
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1995-07-26
Vascular Plant	<i>Juniperus communis</i>	Ground Juniper		SR	1995-06-02
Vascular Plant	<i>Buchnera americana</i>	Bluehearts		SE	1995-07-24
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1995-07-26
Vascular Plant	<i>Pinus banksiana</i>	Jack Pine		SR	1995-06-02
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	1995-06-02
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1995-06-02
22					
Vascular Plant	<i>Aristida intermedia</i>	Slim-spike Three-awn Grass		SR	1995-09-21
23					
Vascular Plant	<i>Cirsium pitcheri</i>	Dune Thistle	LT	ST	1909-06
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	2000-04-07

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
24					
CLARK AND PINE NATURE PRESERVE					
Insect Lepidoptera	Crambus bidens		SR		2002
Insect Lepidoptera	Papaipema pterisii	Bracken Borer Moth	WL		2005
Insect Lepidoptera	Papaipema speciosissima	The Royal Fern Borer Moth	ST		2005
Reptile	Clemmys guttata	Spotted Turtle	SE		2005-06-05
High Quality Natural C	Prairie - sand dry	Dry Sand Prairie	SG		1978-07
Insect Homoptera	Paraphilaenus parallelus	A Spittle Bug	ST		2005
Insect Lepidoptera	Phaneta olivaceana		SR		2005
Vascular Plant	Melampyrum lineare	American Cow-wheat	SR		1907-07
Vascular Plant	Orobancha fasciculata	Clustered Broomrape	SE		1986-06-24
Insect Lepidoptera	Phytometra ernestiana	Ernestine's Moth	SE		2005
Insect Homoptera	Prairiana kansana	The Kansas Prairie Leafhopper	SE		2005
Vascular Plant	Carex aurea	Golden-fruited Sedge	SR		2004
Vascular Plant	Carex garberi	Elk Sedge	ST		1986-05
Insect Lepidoptera	Oligia obtusa	A Noctuid Moth	SE		2005
Insect Homoptera	Polyamia caperata	Little Bluestem Polyamia	SR		2005
Vascular Plant	Potamogeton pulcher	Spotted Pondweed	SE		1897-06-21
Insect Orthoptera	Psinidia fenestralis	Sand Locust	SR		2005
Insect Lepidoptera	Pygarcia spraguei	Sprague's Pygarcia	SR		2005
Reptile	Ophisaurus attenuatus attenuatus	Western Slender Glass Lizard			1991-04-23
Vascular Plant	Carex eburnea	Ebony Sedge	SR		1986-07-15
Insect Orthoptera	Paroxysma atlantica	A Grasshopper	ST		2005
Insect Lepidoptera	Cynia inopinatus	The Unexpected Milkweed Moth	SR		2005
Vascular Plant	Platanthera hyperborea	Leafy Northern Green Orchis	ST		2008-07-03
Insect Lepidoptera	Melipotis jucunda	A Noctuid Moth	SR		2005
Insect Orthoptera	Phoetaliotes nebrascensis	Large-headed Grasshopper	ST		2005
Insect Lepidoptera	Papaipema leucostigma	Columbine Borer	ST		2005
Vascular Plant	Carex crawei	Crawe Sedge	ST		1987
Insect Homoptera	Philaenarcys killa	Great Lakes dune spittlebug	SR		2005
Vascular Plant	Cornus canadensis	Bunchberry	SE		1878-05
Insect Lepidoptera	Metanema determinata	Dark Metanema	SR		2005
Vascular Plant	Coeloglossum viride var. virescens	Long-bract Green Orchis	ST		NO DATE
Vascular Plant	Cirsium hillii	Hill's Thistle	SE		1987-06-11
Reptile	Clemmys guttata	Spotted Turtle	SE		2009-06-28
High Quality Natural C	Prairie - sand wet-mesic	Wet-mesic Sand Prairie	SG		1980
Insect Lepidoptera	Capis curvata	A Noctuid Moth	ST		2005
Insect Lepidoptera	Meropleon ambifuscum	Newman's Brocade	ST		2005
Insect Lepidoptera	Melanomma auricinctaria	Huckleberry Eye-spot Moth	SR		2002
Insect Lepidoptera	Macrochilo louisiana		ST		2005
Insect Homoptera	Prosapia ignipectus	Red-legged Spittle Bug	SR		2005
Insect Orthoptera	Melanoplus keeleri luridus	Keeler's Spur-throated Grasshopper	SR		2005
Insect Lepidoptera	Papaipema beeriana	Beer's Blazing Star Borer Moth	ST		2005
Vascular Plant	Pinus banksiana	Jack Pine	SR		2004
Vascular Plant	Carex richardsonii	Richardson Sedge	ST		2004
Insect Orthoptera	Melanoplus fasciatus	Huckleberry Spur-throat Grasshopper	SR		2005
Insect Lepidoptera	Protorthodes incincta	Saturn quaker	SR		2005
Insect Lepidoptera	Phaneta umbrastriana		SR		2005
Insect Orthoptera	Orphulella pelidna	Green Desert Grasshopper	SR		2005
Insect Orthoptera	Conocephalus saltans	Prairie Meadow Katydid	SR		2005

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	1985-06-29
Insect Lepidoptera	<i>Hypenodes caducus</i>	Large Hypenodes		SR	2005
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1990-SU
Vascular Plant	<i>Thuja occidentalis</i>	Northern White Cedar		SE	1898-06-28
Insect Lepidoptera	<i>Thorybes pylades</i>	Northern Cloudywing		SR	2005
Insect Orthoptera	<i>Hesperotettix viridis pratensis</i>	A Grasshopper		SR	2005
Vascular Plant	<i>Amelanchier humilis</i>	Running Serviceberry		SE	1985
Reptile	<i>Thamnophis proximus proximus</i>	Western Ribbon Snake		SSC	1987-06-06
Insect Lepidoptera	<i>Ancylis semiovana</i>			SR	2005
Vascular Plant	<i>Eriophorum angustifolium</i>	Narrow-leaved Cotton-grass		SR	1986
Amphibian	<i>Ambystoma laterale</i>	Blue-spotted Salamander		SSC	1978-08
Insect Odonata	<i>Sympetrum semicinctum</i>	Band-winged Meadowhawk		SR	2005
Insect Lepidoptera	<i>Hesperia ottoe</i>	Ottoe Skipper		SE	2005
Insect Lepidoptera	<i>Apamea burgessi</i>	A Noctuid Moth		ST	2005
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	2004
Vascular Plant	<i>Equisetum variegatum</i>	Variegated Horsetail		SE	1955-08-31
Insect Lepidoptera	<i>Apamea nigrior</i>	Black-dashed Apamea		SR	2005
Vascular Plant	<i>Spiranthes lucida</i>	Shining Ladies'-tresses		SR	1934-06
Vascular Plant	<i>Aralia hispida</i>	Bristly Sarsaparilla		SE	1880-06
Insect Lepidoptera	<i>Iodopepla u-album</i>	A Noctuid Moth		SR	2005
Bird	<i>Rallus elegans</i>	King Rail		SE	1978-08
Insect Lepidoptera	<i>Anepia capsularis</i>	The Starry Champion Capsule Moth		SR	2005
Vascular Plant	<i>Utricularia purpurea</i>	Purple Bladderwort		SR	2004
Insect Lepidoptera	<i>Faronta rubripennis</i>	The Pine Streak		ST	2005
Insect Homoptera	<i>Flexamia pyrops</i>	The Long-nose Three-awn Leafhopper		SR	2005
Insect Homoptera	<i>Flexamia reflexus</i>	Indiangrass Flexamia		ST	2005
High Quality Natural C	Wetland - panne	Panne		SG	1984-12
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	2004
Insect Lepidoptera	<i>Euphyes dion</i>	Sedge Skipper		SR	2005
Insect Lepidoptera	<i>Grammia figurata</i>	The Figured Grammia		SR	2005
Insect Lepidoptera	<i>Eucosma fulminana</i>			SR	2005
Vascular Plant	<i>Tofieldia glutinosa</i>	False Asphodel		SR	1986-08-25
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1985-07-11
Vascular Plant	<i>Utricularia minor</i>	Lesser Bladderwort		ST	1897-06
Insect Lepidoptera	<i>Hesperia leonardus</i>	Leonard's Skipper		SR	2005
Insect Lepidoptera	<i>Eucrotopcnemis fimbriaris</i>	A Noctuid Moth		ST	2002
Vascular Plant	<i>Utricularia cornuta</i>	Horned Bladderwort		ST	1916-08-26
Vascular Plant	<i>Eriophorum gracile</i>	Slender Cotton-grass		ST	1934-06
Vascular Plant	<i>Triglochin palustris</i>	Marsh Arrow-grass		SR	1896-08-28
Insect Lepidoptera	<i>Agrotis vetusta</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Trichosilia manifesta</i>	The Record Keeper Moth		SR	2002
Insect Lepidoptera	<i>Grammia phyllira</i>	The Sand Barrens Grammia		SR	2005
Vascular Plant	<i>Satureja glabella</i> var. <i>angustifolia</i>	Calamint		SE	1926-09
Insect Lepidoptera	<i>Leucania linita</i>	Salt Marsh Wainscot		SR	2005
Insect Lepidoptera	<i>Archanara laeta</i>			ST	2005
Vascular Plant	<i>Linnaea borealis</i>	Twinflower		SX	1897-06-12
Insect Lepidoptera	<i>Loxagrotis grotei</i>	Grote's Black-tipped Quaker		ST	2002
Bird	<i>Botaurus lentiginosus</i>	American Bittern		SE	1978-07
Vascular Plant	<i>Ludwigia sphaerocarpa</i>	Globe-fruited False-loosestrife		SE	1952-08-09
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07-11
Vascular Plant	<i>Cypripedium candidum</i>	Small White Lady's-slipper		WL	1898-06
Insect Lepidoptera	<i>Lesmone detrahens</i>	A Moth		SR	2005

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Homoptera	Bruchomorpha extensa	The Long-nosed Elephant Hopper		SR	2005
Insect Lepidoptera	Leucania inermis	A Moth		SR	2005
Vascular Plant	Salix cordata	Heartleaf Willow		ST	1898-06
Vascular Plant	Buchnera americana	Bluehearts		SE	2004
Vascular Plant	Rhus aromatica var. arenaria	Beach Sumac		SR	2004
Insect Lepidoptera	Rhodoecia aurantiago	Aureolaria Seed Borer		ST	2005
Insect Lepidoptera	Lycaena xanthoides	Great Copper		SE	2002
Vascular Plant	Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slipper		SR	1989-05-24
Insect Lepidoptera	Macrochilo absorptalis	A Moth		SR	2005
Bird	Rallus limicola	Virginia Rail		SE	1978-07-11
Insect Lepidoptera	Macrochilo hypocritalis	A Noctuid Moth		SR	2005
Insect Orthoptera	Pardalophora phoenicoptera	Orange-winged Grasshopper		SR	2005
Vascular Plant	Eleocharis geniculata	Capitate Spike-rush		ST	1986
Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1994-08-03
Vascular Plant	Juncus balticus var. littoralis	Baltic Rush		SR	1985-07-11
Vascular Plant	Arenaria stricta	Michaux's Stitchwort		SR	2004
Reptile	Emydoidea blandingii	Blanding's Turtle		SE	2007-03-29
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1991-08-29
Vascular Plant	Aristida intermedia	Slim-spike Three-awn Grass		SR	1927-05-23
Vascular Plant	Sisyrinchium montanum	Strict Blue-eyed-grass		SE	1986
Insect Lepidoptera	Atrytonopsis hianna	Dusted Skipper		ST	2005
Vascular Plant	Shepherdia canadensis	Canada Buffalo-berry		SX	1997-07-22
Insect Lepidoptera	Schinia sanguinea	Bleeding Flower Moth			1986
Vascular Plant	Juncus scirpoides	Scirpus-like Rush		ST	1985-07-11
Vascular Plant	Scirpus subterminalis	Water Bulrush		SR	1878-07-02
Insect Lepidoptera	Lemmeria digitalis	A Noctuid Moth		SR	2005
Insect Lepidoptera	Semiothisa mellistrigata	A Geometrid Moth		SR	2005
Vascular Plant	Aster borealis	Rushlike Aster		SR	1985-07-11

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Bird	Ixobrychus exilis	Least Bittern		SE	1978-07-11
Vascular Plant	Ceanothus herbaceus	Prairie Redroot		SE	1903-05-30
Vascular Plant	Eleocharis geniculata	Capitate Spike-rush		ST	1991-08-12
Vascular Plant	Cypripedium candidum	Small White Lady's-slipper		WL	1897-05-29
Vascular Plant	Eriophorum angustifolium	Narrow-leaved Cotton-grass		SR	1982
Bird	Chlidonias niger	Black Tern		SE	1978-07-11
Vascular Plant	Cornus rugosa	Roundleaf Dogwood		SR	1920-07
Vascular Plant	Juncus balticus var. littoralis	Baltic Rush		SR	1991-08-13
Vascular Plant	Eriophorum gracile	Slender Cotton-grass		ST	1934-06
Vascular Plant	Orobancha fasciculata	Clustered Broomrape		SE	1926-06-21
Vascular Plant	Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slipper		SR	1978-01-25
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1991-08-29
Vascular Plant	Spiranthes lucida	Shining Ladies'-tresses		SR	1934-06-09
Vascular Plant	Arctostaphylos uva-ursi	Bearberry		SR	1978-01-25
Bird	Botaurus lentiginosus	American Bittern		SE	1978-07
Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1978-08
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07
Vascular Plant	Platanthera hyperborea	Leafy Northern Green Orchis		ST	1978-01
Vascular Plant	Arenaria stricta	Michaux's Stitchwort		SR	1978-01-25
High Quality Natural C	Prairie - sand dry	Dry Sand Prairie		SG	1978-07
Vascular Plant	Aristida intermedia	Slim-spike Three-awn Grass		SR	1991-08-12
Vascular Plant	Carex aurea	Golden-fruited Sedge		SR	1978-01-25
Bird	Rallus elegans	King Rail		SE	1978-08
Vascular Plant	Satureja glabella var. angustifolia	Calamint		SE	1895-06-28

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1978-07
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	1923-07
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1956-06-26
Vascular Plant	<i>Pinus banksiana</i>	Jack Pine		SR	1978-07
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1991-08-29
High Quality Natural C	Wetland - panne	Panne		SG	1978-07-11
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07
Vascular Plant	<i>Utricularia minor</i>	Lesser Bladderwort		ST	1897-06
Vascular Plant	<i>Utricularia cornuta</i>	Horned Bladderwort		ST	1893-09-04

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High Quality Natural C	Savanna - sand dry	Dry Sand Savanna		SG	1978-07
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Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-12
Vascular Plant	<i>Arenaria stricta</i>	Michaux's Stitchwort		SR	2008-06-10
Vascular Plant	<i>Aristida intermedia</i>	Slim-spike Three-awn Grass		SR	1986-12-16
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1991-08-12
Vascular Plant	<i>Aster sericeus</i>	Western Silvery Aster		SR	1978-11
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07
Insect Odonata	<i>Sympetrum semicinctum</i>	Band-winged Meadowhawk		SR	1999
High Quality Natural C	Wetland - panne	Panne		SG	1978-07-11

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Vascular Plant	<i>Solidago simplex</i> var. <i>gillmanii</i>	Sticky Goldenrod		ST	1900-08-04
Vascular Plant	<i>Platanthera hookeri</i>	Hooker Orchis		SX	1893-06
Vascular Plant	<i>Lechea stricta</i>	Upright Pinweed		SX	1881-09-10
Vascular Plant	<i>Carex limosa</i>	Mud Sedge		SE	1895-06-30
Vascular Plant	<i>Talinum rugospermum</i>	Prairie Fame-flower		ST	1915-08-22
Vascular Plant	<i>Platanthera psycodes</i>	Small Purple-fringe Orchis		SR	1928-08-04
Vascular Plant	<i>Polygonella articulata</i>	Eastern Jointweed		SR	1955-08-31

30**PINE STATION NATURE PRESERVE**

Vascular Plant	<i>Orobanche fasciculata</i>	Clustered Broomrape		SE	2006-05-28
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Bird	<i>Cistothorus palustris</i>	Marsh Wren		SE	2000-06-10
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32**PINE STATION NATURE PRESERVE**

Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	1991-08-13
Reptile	<i>Thamnophis proximus proximus</i>	Western Ribbon Snake		SSC	2005-09-20
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	2008-04-16
Vascular Plant	<i>Satureja glabella</i> var. <i>angustifolia</i>	Calamint		SE	2007-08-21
Vascular Plant	<i>Gentiana alba</i>	Yellow Gentian		SR	2008-09-09
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1991-08-13
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1987-08
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1986
Vascular Plant	<i>Tofieldia glutinosa</i>	False Asphodel		SR	1991-08-13
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1991-08-13
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	2007-08-21
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1991-06-08

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

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TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Reptile	<i>Sistrurus catenatus catenatus</i>	Eastern Massasauga	C	SE	1984
Vascular Plant	<i>Eleocharis geniculata</i>	Capitate Spike-rush		ST	1991-08-13
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1990
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-13
Vascular Plant	<i>Alnus rugosa</i>	Speckled Alder		WL	2008-07-09
Vascular Plant	<i>Buchnera americana</i>	Bluehearts		SE	2008-07-09
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	2007-09-04
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1991-06-14
Vascular Plant	<i>Melampyrum lineare</i>	American Cow-wheat		SR	1907-07-28
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1991-05-14
Bird	<i>Cistothorus palustris</i>	Marsh Wren		SE	1991-07-29
Vascular Plant	<i>Potamogeton pulcher</i>	Spotted Pondweed		SE	2000 Summ
Vascular Plant	<i>Potamogeton pulcher</i>	Spotted Pondweed		SE	2007-05-10
Vascular Plant	<i>Carex garberi</i>	Elk Sedge		ST	1991-06-14
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			1990
Vascular Plant	<i>Cirsium hillii</i>	Hill's Thistle		SE	1987
Vascular Plant	<i>Platanthera hyperborea</i>	Leafy Northern Green Orchis		ST	2008-06-17
Reptile	<i>Clemmys guttata</i>	Spotted Turtle		SE	2007-03-29
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	1956-05-19
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper		SR	1989-05-24
Vascular Plant	<i>Carex brunnescens</i>	Brownish Sedge		SE	1991-08-08
Insect Lepidoptera	<i>Capis curvata</i>	A Noctuid Moth		ST	1999

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Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1994-06-03
High Quality Natural C	Prairie - sand wet-mesic	Wet-mesic Sand Prairie		SG	1978-07-20
High Quality Natural C	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-20

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Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	1994-07-28
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1994-06-03

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IVANHOE DUNE AND SWALE NATURE PRESERVE

Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	2008-07-18
High Quality Natural C	Savanna - sand mesic	Mesic Sand Savanna		SG	1978-07-23
High Quality Natural C	Prairie - sand wet	Wet Sand Prairie		SG	1978-07-23
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			1990
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1994-06-03
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07-23
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07-23
Bird	<i>Certhia americana</i>	Brown Creeper			1991-05-01
High Quality Natural C	Wetland - swamp shrub	Shrub Swamp		SG	1978-07-23
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1991-04-18
High Quality Natural C	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-23

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IVANHOE DUNE AND SWALE NATURE PRESERVE

Vascular Plant	<i>Platanthera hyperborea</i>	Leafy Northern Green Orchis		ST	1985
Amphibian	<i>Ambystoma laterale</i>	Blue-spotted Salamander		SSC	2008-06-01
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	1991-11-01

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE	SPECIES NAME	COMMON NAME	FED	STATE	DATE
High Quality Natural (	Wetland - swamp shrub	Shrub Swamp		SG	1978-07
High Quality Natural (	Prairie - sand wet	Wet Sand Prairie		SG	1978-07
High Quality Natural (	Lake - pond	Pond		SG	1978-07-23
High Quality Natural (	Prairie - sand mesic	Mesic Sand Prairie		SG	1978-07-23
High Quality Natural (	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-23
Vascular Plant	Diervilla lonicera	Northern Bush-honeysuckle		SR	1985
High Quality Natural (	Savanna - sand mesic	Mesic Sand Savanna		SG	1978-07-23
Vascular Plant	Prunus pensylvanica	Fire Cherry		SR	1985
Insect Lepidoptera	Problema byssus	Bunchgrass Skipper		ST	1995-08-04
Vascular Plant	Rhus aromatica var. arenaria	Beach Sumac		SR	1985
Vascular Plant	Juncus balticus var. littoralis	Baltic Rush		SR	1985

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CLINE AVENUE NATURE PRESERVE

Insect Lepidoptera	Phaneta striatana		SR	2005
Insect Lepidoptera	Aethes patricia		SE	2005
Insect Lepidoptera	Papaipema maritima	The Giant Sunflower Borer Moth	ST	2005
Insect Lepidoptera	Croesia semipurpurana		SR	2005
Insect Lepidoptera	Eucosma fulminana		SR	2005
Insect Orthoptera	Chloealtis conspersa	Sprinkled Locust	SR	2005
Insect Lepidoptera	Phaneta raracana		SR	2005
Insect Homoptera	Graminella mohri		SR	2005
Insect Lepidoptera	Grammia phyllira	The Sand Barrens Grammia	SR	2005
Insect Lepidoptera	Macrochilo absorptalis	A Moth	SR	2005
Insect Lepidoptera	Macrochilo hypocritalis	A Noctuid Moth	SR	2005
Insect Lepidoptera	Phaneta olivaceana		SR	2005
Insect Lepidoptera	Peoria gemmatella	Gemmed Cordgrass Borer	SR	2005
Insect Lepidoptera	Lycaena helloides	Purplish Copper	SR	2005
Insect Lepidoptera	Protorthodes incincta	Saturn quaker	SR	2005
Insect Homoptera	Mesamia nigradorsum	A Leafhopper	SR	2005
Insect Lepidoptera	Nola cilicoides		SR	2005
Vascular Plant	Carex aurea	Golden-fruited Sedge	SR	2007-06-26
Insect Lepidoptera	Semiothisa eremiata	The Goat's Rue Looper	SR	2005
Reptile	Emydoidea blandingii	Blanding's Turtle	SE	2007-06-01
Insect Homoptera	Prosapia ignipectus	Red-legged Spittle Bug	SR	2005
Insect Lepidoptera	Scirpophaga perstialis		SR	2005
Insect Lepidoptera	Eucosma bilineana		SR	2005
Insect Lepidoptera	Poanes massasoit	Mulberry Wing Skipper	SR	2005
Insect Homoptera	Cosmotettix bilineatus	Two-lined cosmotettix	ST	2005
Insect Lepidoptera	Leucania linia	Salt Marsh Wainscot	SR	2005
Insect Homoptera	Philaenarcys killa	Great Lakes dune spittlebug	SR	2005
Insect Orthoptera	Conocephalus saltans	Prairie Meadow Katydid	SR	2005
Insect Lepidoptera	Papaipema leucostigma	Columbine Borer	ST	2005

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Insect Homoptera	Chlorotettix fallax	A Leafhopper	SR	2004-09-08
Insect Lepidoptera	Euphyes dion	Sedge Skipper	SR	2004-07-09
Insect Orthoptera	Neoconocephalus nebrascensis	A Katydid	SR	2005-07-24
Insect Lepidoptera	Problema byssus	Bunchgrass Skipper	ST	2003-07-11
Insect Lepidoptera	Papaipema lysimachiae	The St. John'Swort Borer Moth	SR	2000-09-05
Insect Lepidoptera	Macrochilo louisiana		ST	2004-06-22
Insect Lepidoptera	Sphinx luscitiosa	The Luscious Willow Sphinx	SR	2004-06-24
Insect Lepidoptera	Pyrausta laticlavia	The Southern Purple Mint Moth	SR	2005-05-12

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	Spartiniphaga inops	Spartina Borer Moth		SR	2004-09-04

39**CLINE AVENUE NATURE PRESERVE**

High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07
Vascular Plant	Diervilla lonicera	Northern Bush-honeysuckle		SR	1978-07-22
High Quality Natural C	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-22

40**CLINE AVENUE NATURE PRESERVE**

High Quality Natural C	Wetland - swamp shrub	Shrub Swamp		SG	1978-07
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41**TOLLESTON RIDGES NATURE PRESERVE**

High Quality Natural C	Prairie - sand mesic	Mesic Sand Prairie		SG	1978-07-21
Amphibian	Ambystoma laterale	Blue-spotted Salamander		SSC	2005-05-23
High Quality Natural C	Savanna - sand mesic	Mesic Sand Savanna		SG	1978-07-21
Reptile	Emydoidea blandingii	Blanding's Turtle		SE	2007-06-10
High Quality Natural C	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-21
Insect Lepidoptera	Thorybes pylades	Northern Cloudywing		SR	2008-07-18
Vascular Plant	Diervilla lonicera	Northern Bush-honeysuckle		SR	1991-08-10
Insect Lepidoptera	Lycaeides melissa samuelis	Karner Blue	LE	SE	2008-07-18
Vascular Plant	Carex richardsonii	Richardson Sedge		ST	1980-05
Vascular Plant	Solidago simplex var. gillmanii	Sticky Goldenrod		ST	1978-08-11
Vascular Plant	Spiranthes lucida	Shining Ladies'-tresses		SR	1989
Bird	Buteo lineatus	Red-shouldered Hawk		SSC	1978-08
Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1978
Vascular Plant	Cypripedium calceolus var. parviflorum	Small Yellow Lady's-slipper		SR	2004
Bird	Botaurus lentiginosus	American Bittern		SE	1975
Vascular Plant	Prunus pensylvanica	Fire Cherry		SR	1978-08
Vascular Plant	Carex aurea	Golden-fruited Sedge		SR	1978-08-11
Insect Lepidoptera	Satyroides eurydice	Eyed Brown		SR	2008-07-10
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07

42

Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1992-08-09
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Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	2002-09-04
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SEIDNER DUNE AND SWALE NATURE PRESERVE

Insect Lepidoptera	Hesperia leonardus	Leonard's Skipper		SR	2001
Insect Lepidoptera	Grammia phyllira	The Sand Barrens Grammia		SR	2001
Insect Lepidoptera	Peoria gemmatella	Gemmed Cordgrass Borer		SR	2001
Insect Lepidoptera	Semiothisa eremiata	The Goat's Rue Looper		SR	2001

44**SEIDNER DUNE AND SWALE NATURE PRESERVE**

Insect Homoptera	Cosmotettix bilineatus	Two-lined cosmotettix		ST	2003
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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

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TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
SEIDNER DUNE AND SWALE NATURE PRESERVE					
Bird	<i>Cistothorus palustris</i>	Marsh Wren		SE	1987-06-06
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	2001
Bird	<i>Chlidonias niger</i>	Black Tern		SE	1991-07-11
Bird	<i>Ardea alba</i>	Great Egret		SSC	1988-06-10
46					
High Quality Natural C	Wetland - meadow sedge	Sedge Meadow		SG	1978-07
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1991-07-11
Bird	<i>Cistothorus palustris</i>	Marsh Wren		SE	1991-09-15
Bird	<i>Botaurus lentiginosus</i>	American Bittern		SE	1991-07-11
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1991-07-11
Bird	<i>Chlidonias niger</i>	Black Tern		SE	1991-06-25
Bird	<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird		SE	1991-05-14
47					
Vascular Plant	<i>Gentiana alba</i>	Yellow Gentian		SR	2007-08-21
Vascular Plant	<i>Cirsium hillii</i>	Hill's Thistle		SE	2008-07-08
48					
Insect Homoptera	<i>Bruchomorpha dorsata</i>			SR	2005
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	0000
Insect Homoptera	<i>Chlorotettix fallax</i>	A Leafhopper		SR	2005
Insect Lepidoptera	<i>Papaipema maritima</i>	The Giant Sunflower Borer Moth		ST	2005
Insect Lepidoptera	<i>Spartiniphaga inops</i>	Spartina Borer Moth		SR	2005
Insect Lepidoptera	<i>Pyrausta laticlavia</i>	The Southern Purple Mint Moth		SR	2005
Insect Lepidoptera	<i>Papaipema beeriana</i>	Beer's Blazing Star Borer Moth		ST	2005
Insect Homoptera	<i>Bruchomorpha extensa</i>	The Long-nosed Elephant Hopper		SR	2005
Insect Lepidoptera	<i>Peoria tetradella</i>			SR	2005
Insect Homoptera	<i>Polyamia herbida</i>	The Prairie Panic Grass Leafhopper		ST	2005
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	2005
Insect Lepidoptera	<i>Platyperigea meralis</i>	The Rare Sand Quaker		ST	2005
Insect Lepidoptera	<i>Phytometra ernestinana</i>	Ernestine's Moth		SE	2005
Insect Lepidoptera	<i>Phaneta umbrastriana</i>			SR	2005
Insect Lepidoptera	<i>Phaneta olivaceana</i>			SR	2005
Insect Lepidoptera	<i>Macrochilo louisiana</i>			ST	2005
Insect Homoptera	<i>Prosapia ignipectus</i>	Red-legged Spittle Bug		SR	2005
Insect Homoptera	<i>Paraphlepsius maculosus</i>	Peppered Paraphlepsius Leafhopper		ST	0000
High Quality Natural C	Prairie - sand wet-mesic	Wet-mesic Sand Prairie		SG	1978-07
Insect Lepidoptera	<i>Faronta rubripennis</i>	The Pine Streak		ST	2005
Insect Lepidoptera	<i>Polites mystic</i>	Long Dash Skipper		SR	
Insect Homoptera	<i>Paraphlepsius lobatus</i>			ST	2005
Insect Lepidoptera	<i>Papaipema rigida</i>	A Borer Moth		SR	2005
Insect Homoptera	<i>Polyamia caperata</i>	Little Bluestem Polyamia		SR	2005
Insect Lepidoptera	<i>Protorthodes incincta</i>	Saturn quaker		SR	0000
Insect Lepidoptera	<i>Phaneta ochroterminana</i>			SR	2005
Insect Lepidoptera	<i>Tricholita notata</i>	Marked Noctuid		ST	2005
Insect Lepidoptera	<i>Ancylis semiovana</i>			SR	2005
Insect Lepidoptera	<i>Hyperaeschra georgica</i>	A Prominent Moth			2005

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TYPE	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	Grammia figurata	The Figured Grammia		SR	2005
Insect Lepidoptera	Leucania inermis	A Moth		SR	2005
Insect Lepidoptera	Tarachidia binocula	Prairie tarachidia			2005
Insect Lepidoptera	Grammia virguncula			SR	2005
Insect Lepidoptera	Eucosma bilineana			SR	2005
Insect Lepidoptera	Lemmeria digitalis	A Noctuid Moth		SR	2005
Insect Homoptera	Laeviccephalus acus			SR	2005
Insect Lepidoptera	Speyeria aphrodite	Aphrodite Fritillary		WL	2005
Insect Lepidoptera	Eucosma giganteana			SR	2005
Insect Lepidoptera	Erynnis persius persius	Persius Dusky Wing		SE	0000
Insect Lepidoptera	Hesperia leonardus	Leonard's Skipper		SR	0000
Insect Lepidoptera	Agrotis vetusta	A Moth		SR	2005
Insect Lepidoptera	Trichosilia manifesta	The Record Keeper Moth		SR	2005
Insect Orthoptera	Hesperotettix viridis pratensis	A Grasshopper		SR	2005
Insect Lepidoptera	Agrotis stigmata			ST	2005
Insect Orthoptera	Trimerotropis maritima	The Dune Locust		ST	0000
Insect Lepidoptera	Iodopepla u-album	A Noctuid Moth		SR	2005
Insect Lepidoptera	Hypenodes caducus	Large Hypenodes		SR	2005
Insect Lepidoptera	Eucrotopcnemis fimbriaris	A Noctuid Moth		ST	0000
Insect Lepidoptera	Metanema determinata	Dark Metanema		SR	2005
Insect Lepidoptera	Oncocnemis riparia	The Dune Oncocnemis Moth		ST	0000
Insect Homoptera	Flexamia reflexus	Indiangrass Flexamia		ST	2005
Insect Lepidoptera	Oligia obtusa	A Noctuid Moth		SE	2005
Insect Lepidoptera	Notodonta scitipennis	A Notodontid Moth			2005
Reptile	Clemmys guttata	Spotted Turtle		SE	2005-09-14
Insect Lepidoptera	Coenochroa illibella	Dune Panic Grass Moth		SR	2005
Insect Lepidoptera	Aethes patricia			SE	2005
Insect Lepidoptera	Leucania linita	Salt Marsh Wainscot		SR	2005
Insect Lepidoptera	Spilosoma latipennis	The Red-legged Tussock Moth		SR	2005
Insect Odonata	Sympetrum semicinctum	Band-winged Meadowhawk		SR	2005
Insect Lepidoptera	Meropleon ambifusum	Newman's Brocade		ST	2005
Insect Lepidoptera	Apamea nigrior	Black-dashed Apamea		SR	2005
Insect Lepidoptera	Acronicta dactylina			SR	2005
Insect Lepidoptera	Cycnia inopinatus	The Unexpected Milkweed Moth		SR	2005
Insect Lepidoptera	Macrochilo hypocritalis	A Noctuid Moth		SR	2005
Insect Lepidoptera	Macrochilo absorptalis	A Moth		SR	2005
Insect Lepidoptera	Anepia capsularis	The Starry Campion Capsule Moth		SR	2005
Insect Lepidoptera	Lycaeides melissa samuelis	Karner Blue	LE	SE	2008-07-09
Insect Lepidoptera	Fagitana littera	The Marsh Fern Moth		ST	2005
Insect Orthoptera	Conocephalus saltans	Prairie Meadow Katydid		SR	2005

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Vascular Plant	Carex aurea	Golden-fruited Sedge		SR	1991-07-02
Vascular Plant	Eriophorum angustifolium	Narrow-leaved Cotton-grass		SR	1991
Vascular Plant	Carex bebbii	Bebb's Sedge		ST	1991
Bird	Rallus elegans	King Rail		SE	1974-05-22
Reptile	Emydoidea blandingii	Blanding's Turtle		SE	1991
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07
Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1990-07-06
Vascular Plant	Juncus balticus var. littoralis	Baltic Rush		SR	1991
High Quality Natural C	Savanna - sand dry	Dry Sand Savanna		SG	1978-07
Vascular Plant	Selaginella apoda	Meadow Spike-moss		WL	1991
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1992-08-22

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ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

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TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
50					
Vascular Plant	Orobanche fasciculata	Clustered Broomrape		SE	2007-05-28
51					
Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1986-09-10
Amphibian	Necturus maculosus	Common mudpuppy		SSC	1986-07
52					
IVANHOE SOUTH					
High Quality Natural (	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-10
High Quality Natural (	Savanna - sand mesic	Mesic Sand Savanna		SG	1978-07-10
Insect Lepidoptera	Lycaeides melissa samuelis	Karner Blue	LE	SE	2007-07-15
53					
Vascular Plant	Diervilla lonicera	Northern Bush-honeysuckle		SR	1999-09-07
54					
Insect Lepidoptera	Lycaeides melissa samuelis	Karner Blue	LE	SE	1974-SU
55					
Vascular Plant	Aristida tuberculosa	Seabeach Needlegrass		SR	1952-09-21
Vascular Plant	Selaginella rupestris	Ledge Spike-moss		ST	1952-09
Vascular Plant	Carex crawei	Crawe Sedge		ST	1949-06
Vascular Plant	Juncus scirpoides	Scirpus-like Rush		ST	1952-07-27
Vascular Plant	Carex garberi	Elk Sedge		ST	1949-06
Vascular Plant	Polygonella articulata	Eastern Jointweed		SR	1952-09-21
56					
High Quality Natural (	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1982-08-01
High Quality Natural (	Prairie - sand wet	Wet Sand Prairie		SG	1982-08-01
57					
Vascular Plant	Eriophorum angustifolium	Narrow-leaved Cotton-grass		SR	1909-05-31
Insect Odonata	Somatochlora hineana	Hine's Emerald	LE	SX	1945-06-22
Vascular Plant	Lycopodiella inundata	Northern Bog Clubmoss		SE	1879-07-10
Vascular Plant	Polygonella articulata	Eastern Jointweed		SR	1894-09-16
Vascular Plant	Platanthera ciliaris	Yellow-fringe Orchis		SE	1897-07-29
Vascular Plant	Oenothera perennis	Small Sundrops		SR	1949-07-17
Vascular Plant	Aristida tuberculosa	Seabeach Needlegrass		SR	1879-09-13
58					
Insect Lepidoptera	Metarranthia apiciaria	Barrens Metarranthia Moth		SE	1904-07-01
Insect Coleoptera	Nicrophorus americanus	American Burying Beetle	LE	SX	1896
59					
Amphibian	Rana pipiens	Northern Leopard Frog		SSC	2005
60					
Bird	Cistothorus palustris	Marsh Wren		SE	2000-06-24
61					
Bird	Ardea alba	Great Egret		SSC	2003-06-01

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TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Bird	Gallinula chloropus	Common Moorhen		SE	2001-07-27
Bird	Ardea herodias	Great Blue Heron			2003-06-01
62					
Amphibian	Rana pipiens	Northern Leopard Frog		SSC	1973-07-14
63					
Vascular Plant	Carex conoidea	Prairie Gray Sedge		ST	1924-06-05
64					
Vascular Plant	Matteuccia struthiopteris	Ostrich Fern		SR	2000-08-02
Vascular Plant	Rubus enslenii	Southern Dewberry		SE	2000-08-02
Vascular Plant	Carex conoidea	Prairie Gray Sedge		ST	2000-08-02
65					
LAKE ETTA PARK					
Vascular Plant	Eleocharis wolfii	Wolf Spikerush		SR	1985-07-10
Vascular Plant	Carex conoidea	Prairie Gray Sedge		ST	1985-07-10
66					
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1981-08-15
67					
High Quality Natural C	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1981-10-02
68					
ROXANA MARSH					
Bird	Rallus limicola	Virginia Rail		SE	1982-07-20
Bird	Ixobrychus exilis	Least Bittern		SE	1984-06-28
Bird	Chlidonias niger	Black Tern		SE	1989-06-24
Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1985-07-02
Bird	Cistothorus palustris	Marsh Wren		SE	1985-07
Amphibian	Rana pipiens	Northern Leopard Frog		SSC	1984
Bird	Nycticorax nycticorax	Black-crowned Night-heron		SE	1986-06-28
Bird	Xanthocephalus xanthocephalus	Yellow-headed Blackbird		SE	1986-06-21
69					
Mammal	Spermophilus franklinii	Franklin's Ground Squirrel		SE	1992-08-05
70					
Reptile	Ophisaurus attenuatus attenuatus	Western Slender Glass Lizard			1990
Bird	Bartramia longicauda	Upland Sandpiper		SE	1994-05-21
71					
Vascular Plant	Arctostaphylos uva-ursi	Bearberry		SR	1991-08-13
Vascular Plant	Tofieldia glutinosa	False Asphodel		SR	1991-08-13
Vascular Plant	Juncus balticus var. littoralis	Baltic Rush		SR	1991-08-13
Vascular Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses		SE	1991-08-29
Insect Lepidoptera	Hesperia ottoe	Ottoe Skipper		SE	1995-07-08
Vascular Plant	Carex richardsonii	Richardson Sedge		ST	1991-08-13
Vascular Plant	Solidago ptarmicoides	Prairie Goldenrod		SR	1991-08-29
Vascular Plant	Pinus banksiana	Jack Pine		SR	1991-08-13

Fed: LE = listed federal endangered; LT = listed federal threatened; C = federal candidate species

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SG = state significant; WL = watch list; no rank = not ranked but tracked to monitor status

ETR SPECIES WITHIN 4 MILES OF THE GARY LANDFILL, LAKE COUNTY, INDIANA

TYPE	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1991-06-13
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1986-05-28
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1991-08-29
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1991-06-13

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Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	2007-07-12
Vascular Plant	<i>Sisyrinchium montanum</i>	Strict Blue-eyed-grass		SE	2007-07-12
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	2007-07-12

73

Insect Lepidoptera	<i>Schinia indiana</i>	Phlox Moth		SE	1940-05
Amphibian	<i>Rana pipiens</i>	Northern Leopard Frog		SSC	1923-06-30

74**GIBSON WOODS NATURE PRESERVE**

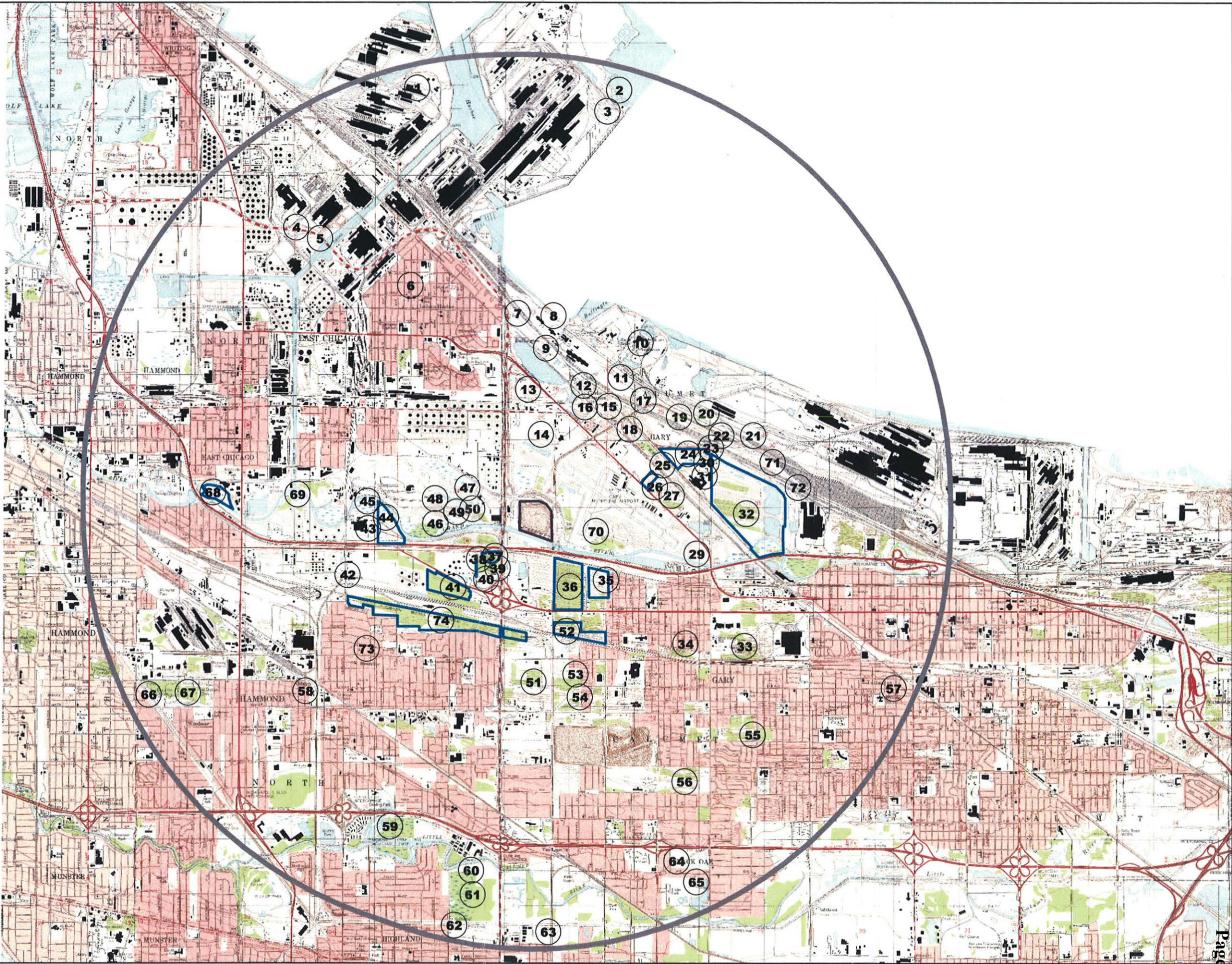
High Quality Natural C	Forest - floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	1978-07
High Quality Natural C	Wetland - swamp shrub	Shrub Swamp		SG	1978-07
Insect Lepidoptera	<i>Euchloe olympia</i>	Olympia Marble		ST	1990-04-25
High Quality Natural C	Wetland - marsh	Marsh		SG	1978-07
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1985-07-02
Vascular Plant	<i>Juglans cinerea</i>	Butternut		WL	1989
Insect Lepidoptera	<i>Papaipema pterisii</i>	Brackish Borer Moth		WL	1992-07-09
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	1989
Vascular Plant	<i>Prunus pensylvanica</i>	Fire Cherry		SR	1989-05-12
Vascular Plant	<i>Satureja glabella</i> var. <i>angustifolia</i>	Calamint		SE	1906-08
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1978-01-25
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	1990
High Quality Natural C	Prairie - sand wet-mesic	Wet-mesic Sand Prairie		SG	1978-07-21
Insect Lepidoptera	<i>Papaipema leucostigma</i>	Columbine Borer		ST	1990-09-11
High Quality Natural C	Prairie - sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07
Reptile	<i>Thamnophis proximus proximus</i>	Western Ribbon Snake		SSC	1991
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1994-07-27
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			2005-06-03
Vascular Plant	<i>Corydalis sempervirens</i>	Pale Corydalis		ST	2008-05-22
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper		SR	1991-08-10
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	1992-07-09
Vascular Plant	<i>Diervilla lonicera</i>	Northern Bush-honeysuckle		SR	1991-08-10
High Quality Natural C	Savanna - sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-21

Fed: LE = listed federal endangered; LT = listed federal threatened; C = federal candidate species

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SG = state significant; WL = watch list; no rank = not ranked but tracked to monitor status

**Gary Development Landfill
Lake County, IN**

Indiana Natural Heritage Data Center
IDNR Nature Preserves
September 15, 2009



0 0.5 1 2 3 4 Miles


State Form 4336

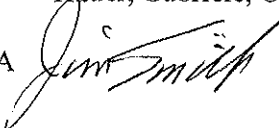
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: December 9, 2009

TO: Jaworski, Mark, OLQ SI THRU: Admire, Beth, OLC 
Hauer, Gabriele, OLQ SI

FROM: Smith, Jim R., OLC, NRDA 

SUBJECT: Gary Development Landfill Site, Gary, Lake County, Indiana

The Indiana Department Environmental Management (IDEM) Natural Resource Damages Program was asked to provide information relative to the use of the Gary Development Landfill site by Threatened and/or Endangered Species. This MEMO summarizes information relative to rare, threatened or endangered species use of habitat surrounding the Gary Development site in Gary, Lake County, Indiana.

I preface this discussion with the following information about rare, threatened and endangered species status in Indiana.

- 1). *Endangered Species* are identified and protected by law in Indiana at:
IC 14-22-34 Chapter 34. Nongame and Endangered Species Conservation

IC 14-22-34-1 "Endangered species" defined

Sec. 1. (a) As used in this chapter, "endangered species" means any species or subspecies of wildlife whose prospects of survival or recruitment within Indiana are in jeopardy or are likely within the foreseeable future to become so due to any of the following factors:

(1) The destruction, drastic modification, or severe curtailment of the habitat of the wildlife.

(2) The overutilization of the wildlife for scientific, commercial, or sporting purposes.

(3) The effect on the wildlife of disease, pollution, or predation.

(4) Other natural or manmade factors affecting the prospects of survival or recruitment within Indiana.

(5) Any combination of the factors described in subdivisions (1) through (4).

(b) The term includes the following:

(1) Any species or subspecies of fish or wildlife appearing on the United States list of endangered native fish and wildlife (50 CFR 17, Appendix D).

(2) Any species or subspecies of fish and wildlife appearing on the United States

list of endangered foreign fish and wildlife (50 CFR 17, Appendix A).

- 2) **Threatened Species** are not defined nor protected directly by Indiana's Law, but development of rules by Indiana Department of Natural Resources (provided for in the Law) does address different definitions of **Species of Special Concern, Rare, or Threatened**. The Term Threatened is defined in IDNR's Fish and Wildlife Rule as follows.

312 IAC 9-1-14 "Threatened species" defined

Authority: IC 14-11-2-1; IC 14-22-2-6

Affected: IC 14-22

Sec. 14. "Threatened species" means a species or subspecies of wild animal likely to become endangered within the foreseeable future, including all species or subspecies classified as threatened by the federal government which occur in Indiana. (*Natural Resources Commission; 312 IAC 9-1-14; filed May 12, 1997, 10:00 a.m.: 20 IR 2699; readopted filed Jul 28, 2003, 12:00 p.m.: 27 IR 286*)

- 3) **Species of Special Concern** are defined and Rare, Threatened and Endangered plants and invertebrates are afforded protection by Non-Rule Policy adopted and amended by Indiana Natural Resources Commission at:

NATURAL RESOURCES COMMISSION Information Bulletin #2 (Fourth Amendment) August 1, 2007 (<http://www.in.gov/legislative/iac/20070815-IR-312070469NRA.xml.html>).

Exerts from this publication follow:

"INDIANA CLASSIFICATIONS

This section sets forth the classifications used in Indiana for wild animals, including **mammals, birds, reptiles, amphibians, fish, mollusks, and crustaceans**. The classifications used for insects and plants are set forth in Section IV(G) and Section V respectively.

"Endangered" means any animal species or subspecies whose prospects for survival or recruitment within the state are in immediate jeopardy and are in danger of disappearing from the state. This includes all species classified as endangered by the federal government that occur in Indiana.

"Special Concern" means an animal species requiring monitoring because of known or suspected vulnerability, limited abundance, or distribution in Indiana or a change in legal status or required habitat of the species of animal has occurred.

INSECTS

1. **Extirpated:** An insect is considered state extirpated if any of the following three conditions occur: (a) A species is declared extirpated by a specialist for the species, family, or order to which the insect belongs. (b) A species has not been located in Indiana as a naturally occurring breeding population for more than 15 years, but the species exists outside Indiana as a wild population. (c) A species appears on a federal list as being extirpated in Indiana.

2. **Endangered:** An insect species is considered state endangered if its prospects for

survival or recruitment within Indiana are in immediate jeopardy, and is in danger of disappearing from the state, where any of the following three conditions occur: (a) A species which may occur in Indiana is classified as endangered by the federal government. (b) A species is biologically dependent on a threatened or endangered plant species. (c) A species is known from fewer than five sites in Indiana. An insect is also considered endangered if the insect is listed as extirpated but is later rediscovered in Indiana, whether the population is endemic or believed to be recently adventive. The discovery of any life stage of an extirpated or endangered species is fiduciary evidence that a population exists. An endangered species of insect does not include any of the following: (a) A species that is not known as a population in Indiana but which ranges into the state from Michigan, Ohio, Illinois, or Kentucky. (b) A nonregulated adventive species. (c) A species regulated under [IC 14-24](#) and [312 IAC 18-3](#) (including a species used for biological control).

3. Threatened: A state threatened species is one which is likely to become endangered within the foreseeable future, where any of the following three conditions occur: (a) A species which occurs in Indiana is classified as threatened by the federal government. (b) A species is biologically dependent upon a rare or threatened plant species. (c) A species is known from six to 10 sites in Indiana. The discovery of a single life stage in situ is fiduciary evidence that a population exists. A threatened species does not include accidentals, adventive nonregulated species, nor any species subject to [IC 14-24](#) and [312 IAC 18-3](#) (including a species used for biological control).

4. Rare: A state rare insect species is a species where problems of limited abundance or distribution in Indiana are known or reasonably suspected including the following: (a) A species that is known to be rare in Michigan, Ohio, Illinois, or Kentucky. (b) A species that is biologically dependent upon a rare plant species. A rare species references an established population. A rare species does not include accidentals, adventive nonregulated species, or other species regulated under [IC 14-24](#) and [312 IAC 18-3](#) (including species used for biological control).

VASCULAR PLANTS

1. Extirpated: A plant species that is believed to be originally native to Indiana but without any currently known populations within the state.

2. Endangered: A species of plant that is known to occur currently on five or fewer sites in Indiana.

3. Threatened: A species of plant known to occur currently on six to 10 sites in Indiana.

4. Rare: A species of plant known to occur currently on 11 to 20 sites.”

Definitions outlined above are utilized in the following regarding the status of habitat known to be used by State designated endangered or threatened species.

Biological Communities and Threatened and Endangered Species surrounding the Gary Development Landfill

The Indiana Department of Natural Resources (2009) Natural Heritage Data Base provided information on endangered, threatened and rare species reported and recorded at natural areas within 4 miles of the Gary Development Landfill site. The Natural Heritage Database illustrates a total of 34 endangered, 48 threatened, 124 rare and 5 special concern species have been recorded at suitable habitat within 1.5 mile of the Gary Development Landfill site in Gary, Indiana **Table 1**. More recent surveys have indicated an additional state endangered plant species, *Carex atherodes* (Rothrock 2007b) and a state special concern amphibian, *Acris crepitans* (Resetar and Resetar 2008) have been recorded within 1.5 miles of the site. **Figure 1** illustrates managed and natural areas surrounding the Gary Development site where most of the State-listed species have been recorded.

An examination of Indiana Breeding Bird Atlas (BBA) information for 1985-1990 and 2005-2010 indicated that the Upland Sandpiper (*Bartramia longicauda*) has been the only State Endangered bird species recorded in the Highland-2 BBA Block; the block that Gary Development Landfill is within (see **Figure 2**). However, an examination of Indiana Natural Heritage Database indicate records of 7 endangered bird species, 8 endangered insect species, 3 endangered reptiles 1 endangered mammal and 17 endangered vascular plants occur within this BBA Block. A total of 36 State Endangered and 2 Federal Endangered species have been recorded within the block. Additionally, 91 State Rare, 4 State Species of Special Concern, 36 State Threatened and 3 Watch List species have been recorded within the Highland-2 BBA Block (see **Figure 3** and **Table 2**). It must be noted that the Highland-2 BBA Block was not, nor is it during the 2005-2010 BBA update, a primary Block. Rather, Highland-1 BBA Block is the closest primary Block utilized for the Indiana BBA (John Castrale, personal communication).

The Highland-1 BBA Block, the eastern edge of which is located within ¼ mile of the Gary Development landfill site had 6 State-listed birds recorded during the 1985 surveys (see **Figure 4**). Additionally, a total of 21 State Endangered Species, 55 State Rare Species, 27 State Threatened Species, 5 State Species of Special Concern and 5 State Watch List Species have been recorded within this adjacent BBA Block (**Table 3**).

Recent studies have documented additional sensitive species in area near the Gary Development Landfill site. Rothrock (2007a) conducted an assessment of plant communities associated with wetland shelves (riverine wetlands) along the Grand Calumet River in June 2007. Wetland 7 of this survey was located just upstreram of the Gary Development Landfill site adjacent and across the river from the Gary/Chicago International Airport. Rothrock (2007b) found the following:

The north shore bordering the Gary Airport property was dominated by *Typha* spp. in wettest zones and *Phragmites australis* in drier zones. A noteworthy slough containing a sedge meadow was uncovered (N41.61012 W87.40314). The area is an estimated 35 x 12 m and is oriented parallel to the River shoreline. It was the only site that recorded remnant natural quality (i.e., mean C > 3.5) and a PIBI above the poor level. At least 12 native hydrophyte species were observed including these conservative species: *Carex*

aquaticus, *C. utriculata*, *Scirpus cf. pedicellatus*, and *Thelypteris palustris*. Moreover, it had a colony of *Carex atherodes*, a species listed as state endangered.

The south shore of W7 was variously dominated by *Typha* spp. and *Phragmites australis*. An occasional individual plant belonging to a conservative species was observed. These included *Cicuta bulbifera* and *Rumex orbiculatus*; but overall native diversity was low.

During the 2007 riverine wetland shelves plant community assessment (Rothrock 2007a), marsh wrens (*Cisothorus palustris*) were observed flying from and perched on cattails at several locations along the Grand Calumet River including just upstream and across the river from the Gary Development Landfill site (Smith, personal communication). No marsh wrens were actually recorded using the Gary Development Landfill site.

Recent sighting of marsh wren (state endangered) and Bebb's sedge (state threatened) illustrate the potential importance of Gary Development Landfill site as habitat for sensitive species along the Grand Calumet River. The site is an important component of the Grand Calumet River corridor and could provide critical habitat linking state protected natural areas and the dispersal of rare, threatened or endangered species between and among these critical areas. Riverine remnants on the south, southeast and north sides of this site could, with restoration and management, provide habitat for numerous rare, threatened and endangered species as do the near adjacent Seidner Dune and Swale, Tolleston Ridges, DuPont Natural Areas, Ivanhoe Dune and Swale Nature Preserve, Cline Avenue Nature Preserve and the Beemsterboer Natural Area (Figure 1).

Rothrock (2007b) found several state listed plant species in lacustrine and/or palustrine wetlands near the Gary Development Landfill site. The following is a brief discussion of these species from his report:

Listed Species. – No federally threatened or endangered species were encountered in the study sites. At the State level, four listed species were observed.

1. *Carex bebbii* – Bebb's sedge was encountered in three wetlands – Dupont (zone 2), Ivanhoe Dune and Swale (both middle and south swale), and Seidner Dune and Swale (middle site). In summer 2007 this same species was reported at several additional sites on the Grand Calumet River itself. These results suggest that this northern, transcontinental species, though threatened in Indiana as a whole, is frequent in this local area near the Lake Michigan shore.

2. *Eleocharis geniculata* – Capitata spike-rush is a diminutive, seed-bank species that has ephemeral occurrence on exposed mucky pond bottoms in the region near the Lake Michigan shore. It is considered State threatened. Small numbers of individuals were encountered at five wetlands in this investigation – Clark and Pine, Explorer's Triangle, Exxon-Mobil terminal (site 3), Gary Lagoon, and Lake Mary (zone2).

3. *Potamogeton friesii* – Fries' pondweed, a State threatened species, was evident as scattered patches at 5 of 12 sample points around the margin of Bongi Pond. No other submergent vascular plants were observed in these same waters.

Although no record of State Listed Rare, Threatened or Endangered Species actually occurring on the Gary Development Landfill site exists, the information presented above and in the Tables and Figures below illustrate the potential for their use on habitat restored on this site. The importance of the site for connectivity of habitats along the Grand Calumet River was also pointed out by Smith (2009).

Table 1. List of State-listed rare, threatened and endangered species within 1.5 miles of the Gary Development Landfill site, Gary, Lake County, Indiana.

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Bird	<i>Botaurus lentiginosus</i>	American Bittern		SE	1991-07-11
Bird	<i>Chlidonias niger</i>	Black Tern		SE	1991-06-25
Bird	<i>Rallus elegans</i>	King Rail		SE	1978-08
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1990-SU
Bird	<i>Cistothorus palustris</i>	Marsh Wren		SE	2000-06-10
Bird	<i>Bartramia longicauda</i>	Upland Sandpiper		SE	1994-05-21
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1991-07-11
Bird	<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird		SE	1991-05-14
Insect Homoptera	<i>Prairiana kansana</i>	The Kansas Prairie Leafhopper		SE	2005
Insect Lepidoptera	<i>Oligia obtusa</i>	A Noctuid Moth		SE	2005
Insect Lepidoptera	<i>Phytometra ernestinana</i>	Ernestine's Moth		SE	2005
Insect Lepidoptera	<i>Lycaena xanthoides</i>	Great Copper		SE	2002
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	2008-07-18
Insect Lepidoptera	<i>Hesperia ottoe</i>	Ottoe Skipper		SE	1995-06-28
Insect Lepidoptera	<i>Erynnis persius persius</i>	Persius Dusky Wing		SE	2005
Insect Lepidoptera	<i>Aethes patricia</i>			SE	2005
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1994-08-03
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	2007-06-01
Reptile	<i>Clemmys guttata</i>	Spotted Turtle		SE	2009-06-28
Vascular Plant	<i>Geranium bicknellii</i>	Bicknell Northern Crane's-bill		SE	1903-06-15
Vascular Plant	<i>Buchnera americana</i>	Bluehearts		SE	2004
Vascular Plant	<i>Aralia hispida</i>	Bristly Sarsaparilla		SE	1880-06
Vascular Plant	<i>Cornus canadensis</i>	Bunchberry		SE	1878-05
Vascular Plant	<i>Satureja glabella var. angustifolia</i>	Calamint		SE	1906-08

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Orobanche fasciculata</i>	Clustered Broomrape		SE	2007-05-28
Vascular Plant	<i>Ludwigia sphaerocarpa</i>	Globe-fruited False-loosestrife		SE	1952-08-09
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	2004
Vascular Plant	<i>Cirsium hillii</i>	Hill's Thistle		SE	2008-07-08
Vascular Plant	<i>Carex atherodes</i> *	Awned Sedge (Wheat Sedge)		SE	2007
Vascular Plant	<i>Carex limosa</i>	Mud Sedge		SE	1895-06-30
Vascular Plant	<i>Thuja occidentalis</i>	Northern White Cedar		SE	1978-07-12
Vascular Plant	<i>Ceanothus herbaceus</i>	Prairie Redroot		SE	1903-05-30
Vascular Plant	<i>Amelanchier humilis</i>	Running Serviceberry		SE	1985
Vascular Plant	<i>Potamogeton pulcher</i>	Spotted Pondweed		SE	1897-06-21
Vascular Plant	<i>Sisyrinchium montanum</i>	Strict Blue-eyed-grass		SE	1986
Vascular Plant	<i>Equisetum variegatum</i>	Variegated Horsetail		SE	1955-08-31
High Quality Natural (	Prairie -sand mesic	Mesic Sand Prairie		SG	1978-07-23
High Quality Natural (	Prairie -sand wet	Wet Sand Prairie		SG	1978-07-23
High Quality Natural (	Prairie -sand wet-mesic	Wet-mesic Sand Prairie		SG	1980
High Quality Natural (	Forest -floodplain wet-mesic	Wet-mesic Floodplain Forest		SG	1978-07
High Quality Natural (	Lake -pond	Pond		SG	1978-07-23
High Quality Natural (	Prairie -sand dry	Dry Sand Prairie		SG	1978-07
High Quality Natural (	Prairie -sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07-11
High Quality Natural (	Savanna -sand dry	Dry Sand Savanna		SG	1978-07
High Quality Natural (	Savanna -sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-23
High Quality Natural (	Savanna -sand mesic	Mesic Sand Savanna		SG	1978-07-23
High Quality Natural (	Wetland -marsh	Marsh		SG	1978-07
High Quality Natural (	Wetland -meadow sedge	Sedge Meadow		SG	1978-07
High Quality Natural (	Wetland -panne	Panne		SG	1984-12
High Quality Natural (	Wetland -swamp shrub	Shrub Swamp		SG	1978-07-23

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Orthoptera	<i>Hesperotettix viridis pratensis</i>	A Grasshopper		SR	2005
Insect Homoptera	<i>Chlorotettix fallax</i>	A Leafhopper		SR	2005
Insect Homoptera	<i>Mesamia nigradorsum</i>	A Leafhopper		SR	2005
Insect Homoptera	<i>Philaenarcys killa</i>	Great Lakes dune spittlebug		SR	2005
Insect Homoptera	<i>Polyamia caperata</i>	Little Bluestem Polyamia		SR	2005
Insect Homoptera	<i>Prosapia ignipectus</i>	Red-legged Spittle Bug		SR	2005
Insect Homoptera	<i>Flexamia pyrops</i>	The Long-nose Three-awn Leafhopper		SR	2005
Insect Homoptera	<i>Bruchomorpha extensa</i>	The Long-nosed Elephant Hopper		SR	2005
Insect Homoptera	<i>Bruchomorpha dorsata</i>			SR	2005
Insect Homoptera	<i>Graminella mohri</i>			SR	2005
Insect Homoptera	<i>Laevicephalus acus</i>			SR	2005
Insect Lepidoptera	<i>Semiothisa eremita</i>	The Goat's Rue Looper		SR	2005
Insect Lepidoptera	<i>Polites mystic</i>	Long Dash Skipper		SR	2005
Insect Lepidoptera	<i>Papaipema rigida</i>	A Borer Moth		SR	2005
Insect Lepidoptera	<i>Semiothisa mellistrigata</i>	A Geometrid Moth		SR	2005
Insect Lepidoptera	<i>Agrotis vetusta</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Lesmone detrahens</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Leucania inermis</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Macrochilo absorptalis</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Lemmeria digitalis</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Lodopepla u-album</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Macrochilo hypocritalis</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Melipotis jucunda</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Apamea nigrior</i>	Black-dashed Apamea		SR	2005
Insect Lepidoptera	<i>Metanema determinata</i>	Dark Metanema		SR	2005
Insect Lepidoptera	<i>Coenochroa illibella</i>	Dune Panic Grass Moth		SR	2005
Insect Lepidoptera	<i>Satyroides eurydice</i>	Eyed Brown		SR	2008-07-10
Insect Lepidoptera	<i>Peoria gemmatella</i>	Gemmed Cordgrass Borer		SR	2005

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Melanomma auricinctaria</i>	Huckleberry Eye-spot Moth		SR	2002
Insect Lepidoptera	<i>Hyphenodes caducus</i>	Large Hyphenodes		SR	2005
Insect Lepidoptera	<i>Hesperia leonardus</i>	Leonard's Skipper		SR	2005
Insect Lepidoptera	<i>Poanes massasoit</i>	Mulberry Wing Skipper		SR	2005
Insect Lepidoptera	<i>Thorybes pylades</i>	Northern Cloudywing		SR	2005
Insect Lepidoptera	<i>Lycaena helloides</i>	Purplish Copper		SR	2005
Insect Lepidoptera	<i>Leucania linita</i>	Salt Marsh Wainscot		SR	2005
Insect Lepidoptera	<i>Protorthodes incincta</i>	Saturn quaker		SR	2005
Insect Lepidoptera	<i>Euphyes dion</i>	Sedge Skipper		SR	2004-07-09
Insect Lepidoptera	<i>Spartiniphaga inops</i>	Spartina Borer Moth		SR	2005
Insect Lepidoptera	<i>Pygarcia spraguei</i>	Sprague's Pygarcia		SR	2005
Insect Lepidoptera	<i>Grammia figurata</i>	The Figured Grammia		SR	2005
Insect Lepidoptera	<i>Sphinx luscitiosa</i>	The Luscious Willow Sphinx		SR	2004-06-24
Insect Lepidoptera	<i>Trichosilia manifesta</i>	The Record Keeper Moth		SR	2002
Insect Lepidoptera	<i>Grammia phyllira</i>	The Sand Barrens Grammia		SR	2005
Insect Lepidoptera	<i>Pyrausta laticlavata</i>	The Southern Purple Mint Moth		SR	2005-05-12
Insect Lepidoptera	<i>Papaipema lysimachiae</i>	The St. John'Swort Borer Moth		SR	2000-09-05
Insect Lepidoptera	<i>Anepia capsularis</i>	The Starry Campion Capsule Moth		SR	2005
Insect Lepidoptera	<i>Cynia inopinatus</i>	The Unexpected Milkweed Moth		SR	2005
Insect Lepidoptera	<i>Acronicta dactylina</i>			SR	2005
Insect Lepidoptera	<i>Ancylis semiovana</i>			SR	2005
Insect Lepidoptera	<i>Crambus bidens</i>			SR	2005
Insect Lepidoptera	<i>Croesia semipurpurana</i>			SR	2005
Insect Lepidoptera	<i>Eucosma bilineana</i>			SR	2005
Insect Lepidoptera	<i>Eucosma fulminana</i>			SR	2005
Insect Lepidoptera	<i>Eucosma giganteana</i>			SR	2005
Insect Lepidoptera	<i>Grammia virguncula</i>			SR	2005
Insect Lepidoptera	<i>Nola cilicoides</i>			SR	2005

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Peoria tetradella</i>		SR		2005
Insect Lepidoptera	<i>Phaneta ochroterminana</i>		SR		2005
Insect Lepidoptera	<i>Phaneta olivaceana</i>		SR		2005
Insect Lepidoptera	<i>Phaneta raracana</i>		SR		2005
Insect Lepidoptera	<i>Phaneta striatana</i>		SR		2005
Insect Lepidoptera	<i>Phaneta umbrastriana</i>		SR		2005
Insect Lepidoptera	<i>Scirpophaga perstrialis</i>		SR		2005
Insect Lepidoptera	<i>Thorybes pylades</i>	Northern Cloudywing	SR		2008-07-18
Insect Lepidoptera	<i>Spilosoma latipennis</i>	The Red-legged Tussock Moth	SR		2005
Insect Lepidoptera	<i>Pyrausta laticlavata</i>	The Southern Purple Mint Moth	SR		2005
Insect Odonata	<i>Sympetrum semicinctum</i>	Band-winged Meadowhawk	SR		2005
Insect Orthoptera	<i>Hesperotettix viridis pratensis</i>	A Grasshopper	SR		2005
Insect Orthoptera	<i>Neoconocephalus nebrascensis</i>	A Katydid	SR		2005-07-24
Insect Orthoptera	<i>Orphulella pelidna</i>	Green Desert Grasshopper	SR		2005
Insect Orthoptera	<i>Melanoplus fasciatus</i>	Huckleberry Spur-throat Grasshopper	SR		2005
Insect Orthoptera	<i>Melanoplus keeleri luridus</i>	Keeler's Spur-throated Grasshopper	SR		2005
Insect Orthoptera	<i>Pardalophora phoenicoptera</i>	Orange-winged Grasshopper	SR		2005
Insect Orthoptera	<i>Conocephalus saltans</i>	Prairie Meadow Katydid	SR		2005
Insect Orthoptera	<i>Psinidia fenestralis</i>	Sand Locust	SR		2005
Insect Orthoptera	<i>Chloealtis conspersa</i>	Sprinkled Locust	SR		2005
Vascular Plant	<i>Melampyrum lineare</i>	American Cow-wheat	SR		1907-07
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush	SR		1991
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac	SR		2007-07-12
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry	SR		2007-06-18
Vascular Plant	<i>Polygonella articulata</i>	Eastern Jointweed	SR		1955-08-31
Vascular Plant	<i>Carex eburnea</i>	Ebony Sedge	SR		1986-07-15
Vascular Plant	<i>Tofieldia glutinosa</i>	False Asphodel	SR		1986-08-25
Vascular Plant	<i>Prunus pensylvanica</i>	Fire Cherry	SR		1989-05-12

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge	SR		2007-06-26
Vascular Plant	<i>Pinus banksiana</i>	Jack Pine	SR		2004
Vascular Plant	<i>Triglochin palustris</i>	Marsh Arrow-grass	SR		1896-08-28
Vascular Plant	<i>Arenaria stricta</i>	Michaux's Stitchwort	SR		2008-06-10
Vascular Plant	<i>Eriophorum angustifolium</i>	Narrow-leaved Cotton-grass	SR		1991
Vascular Plant	<i>Diervilla lonicera</i>	Northern Bush-honeysuckle	SR		1999-09-07
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod	SR		1995-12-28
Vascular Plant	<i>Utricularia purpurea</i>	Purple Bladderwort	SR		2004
Vascular Plant	<i>Comus rugosa</i>	Roundleaf Dogwood	SR		1920-07
Vascular Plant	<i>Aster borealis</i>	Rushlike Aster	SR		1985-07-11
Vascular Plant	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	SR		1934-06
Vascular Plant	<i>Aristida intermedia</i>	Slim-spike Three-awn Grass	SR		1991-08-12
Vascular Plant	<i>Platanthera psycodes</i>	Small Purple-fringe Orchis	SR		1928-08-04
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper	SR		1989-05-24
Vascular Plant	<i>Scirpus subterminalis</i>	Water Bulrush	SR		1878-07-02
Vascular Plant	<i>Aster sericeus</i>	Western Silvery Aster	SR		1978-11
Vascular Plant	<i>Gentiana alba</i>	Yellow Gentian	SR		2007-08-21
Vascular 'Plant	<i>Carex aurea</i>	Golden-fruited Sedge	SR		1991-07-02
Amphibian	<i>Ambystoma laterale</i>	Blue-spotted Salamander	SSC		2008-06-01
Amphibian	<i>Necturus maculosus</i>	Common mudpuppy	SSC		1986-07
Amphibian **	<i>Acris crepitans</i>	Western Cricket Frog	SSC		2008
Bird	<i>Buteo lineatus</i>	Red-shouldered Hawk	SSC		1978-08
Reptile	<i>Thamnophis proximus proximus</i>	Western Ribbon Snake	SSC		1991
Insect Lepidoptera	<i>Faronta rubripennis</i>	The Pine Streak	ST		2005
Insect Homoptera	<i>Paraphilaenus parallelus</i>	A Spittle Bug	ST		2005
Insect Homoptera	<i>Flexamia reflexus</i>	Indiangrass Flexamia	ST		2005

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Homoptera	<i>Paraphlepsius maculosus</i>	Peppered Paraphlepsius Leafhopper	ST		2005
Insect Homoptera	<i>Polyamia herbida</i>	The Prairie Panic Grass Leafhopper	ST		2005
Insect Homoptera	<i>Cosmotettix bilineatus</i>	Two-lined cosmotettix	ST		2005
Insect Homoptera	<i>Paraphlepsius lobatus</i>		ST		2005
Insect Lepidoptera	<i>Eucrotopcnemis fimbriaris</i>	A Noctuid Moth	ST		2005
Insect Lepidoptera	<i>Apamea burgessi</i>	A Noctuid Moth	ST		2005
Insect Lepidoptera	<i>Capis curvata</i>	A Noctuid Moth	ST		2005
Insect Lepidoptera	<i>Eucrotopcnemis fimbriaris</i>	A Noctuid Moth	ST		2002
Insect Lepidoptera	<i>Rhodoecia aurantiago</i>	Aureolaria Seed Borer	ST		2005
Insect Lepidoptera	<i>Papaipema beeriana</i>	Beer's Blazing Star Borer Moth	ST		2005
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper	ST		2005
Insect Lepidoptera	<i>Papaipema leucostigma</i>	Columbine Borer	ST		2005
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper	ST		2005
Insect Lepidoptera	<i>Loxagrotis grotei</i>	Grote's Black-tipped Quaker	ST		2002
Insect Lepidoptera	<i>Tricholita notata</i>	Marked Noctuid	ST		2005
Insect Lepidoptera	<i>Meropleon ambifuscum</i>	Newman's Brocade	ST		2005
Insect Lepidoptera	<i>Euchloe olympia</i>	Olympia Marble	ST		1990-04-25
Insect Lepidoptera	<i>Papaipema maritima</i>	The Giant Sunflower Borer Moth	ST		2005
Insect Lepidoptera	<i>Fagitana littera</i>	The Marsh Fern Moth	ST		2005
Insect Lepidoptera	<i>Faronta rubripennis</i>	The Pine Streak	ST		2005
Insect Lepidoptera	<i>Platyperigea meralis</i>	The Rare Sand Quaker	ST		2005
Insect Lepidoptera	<i>Papaipema speciosissima</i>	The Royal Fern Borer Moth	ST		2005
Insect Lepidoptera	<i>Agrotis stigmata</i>		ST		2005
Insect Lepidoptera	<i>Archanara laeta</i>		ST		2005
Insect Lepidoptera	<i>Macrochilo louisiana</i>		ST		2005
Insect Lepidoptera	<i>Oncocnemis riparia</i>	The Dune Oncocnemis Moth	ST		2005
Insect Orthoptera	<i>Paroxya atlantica</i>	A Grasshopper	ST		2005
Insect Orthoptera	<i>Phoetaliotes nebrascensis</i>	Large-headed Grasshopper	ST		2005

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Orthoptera	<i>Trimerotropis maritima</i>	The Dune Locust		ST	2005
Vascular Plant	<i>Carex bebbii</i>	Bebb's Sedge		ST	1991
Vascular Plant	<i>Eleocharis geniculata</i>	Capitate Spike-rush		ST	1991-08-12
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1991-06-13
Vascular Plant	<i>Cirsium pitcheri</i>	Dune Thistle	LT	ST	1909-06
Vascular Plant	<i>Carex garberi</i>	Elk Sedge		ST	1991-06-13
Vascular Plant	<i>Salix cordata</i>	Heartleaf Willow		ST	1898-06
Vascular Plant	<i>Utricularia cornuta</i>	Horned Bladderwort		ST	1916-08-26
Vascular Plant	<i>Platanthera hyperborea</i>	Leafy Northern Green Orchis		ST	2008-07-03
Vascular Plant	<i>Utricularia minor</i>	Lesser Bladderwort		ST	1897-06
Vascular Plant	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bract Green Orchis		ST	NO DATE
Vascular Plant	<i>Corydalis sempervirens</i>	Pale Corydalis		ST	2008-05-22
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	2004
Vascular Plant	<i>Talinum rugospermum</i>	Prairie Fame-flower		ST	1915-08-22
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	2004
Vascular Plant	<i>Juncus scirpoides</i>	Scirpus-like Rush		ST	1985-07-11
Vascular Plant	<i>Eriophorum gracile</i>	Slender Cotton-grass		ST	1934-06
Vascular Plant	<i>Solidago simplex</i> var. <i>gillmanii</i>	Sticky Goldenrod		ST	1900-08-04
Vascular Plant	<i>Shepherdia canadensis</i>	Canada Buffalo-berry		SX	1997-07-22
Vascular Plant	<i>Platanthera hookeri</i>	Hooker Orchis		SX	1893-06
Vascular Plant	<i>Linnaea borealis</i>	Twinflower		SX	1897-06-12
Vascular Plant	<i>Lechea stricta</i>	Upright Pinweed		SX	1881-09-10
Insect Lepidoptera	<i>Speyeria aphrodite</i>	Aphrodite Fritillary		WL	2005
Insect Lepidoptera	<i>Papaipema pterisii</i>	Bracken Borer Moth		WL	2005
Vascular Plant	<i>Juglans cinerea</i>	Butternut		WL	1989
Vascular Plant	<i>Selaginella apoda</i>	Meadow Spike-moss		WL	1991

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Cypripedium candidum</i>	Small White Lady's-slipper		WL	1898-06
Bird	<i>Certhia americana</i>	Brown Creeper			1991-05-01
Insect Lepidoptera	<i>Notodonta scitipennis</i>	A Notodontid Moth			2005
Insect Lepidoptera	<i>Hyperaeschra georgica</i>	A Prominent Moth			2005
Insect Lepidoptera	<i>Schinia sanguinea</i>	Bleeding Flower Moth			1986
Insect Lepidoptera	<i>Tarachidia binocula</i>	Prairie tarachidia			2005
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			2005-06-03

Fed: **LE** = listed federal endangered; **LT** = listed federal threatened, **C** = federal candidate species

State: **SE** = state endangered; **ST** = state threatened; **SR** = state rare; **sse** = state species of special concern; **SG** = state significant;

WL = watch list; **no rank** = not ranked but tracked to monitor status

* Rothrock 2007b

** Resetar and Resetar 2008.

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Map #					
23					
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	2000-04-07
Vascular Plant	<i>Cirsium pitcheri</i>	Dune Thistle	LT	ST	1909-06
24					
CLARK AND PINE NATURE PRESERVE					
High Quality Natural (	Prairie -sand wet-mesic	Wet-mesic Sand Prairie		SG	1980
High Quality Natural (	Prairie -sand dry	Dry Sand Prairie		SG	1978-07
High Quality Natural (	Prairie -sand dry-mesic	Dry-mesic Sand Prairie		SG	1978-07-11
High Quality Natural (	Wetland -marsh	Marsh		SG	1978-07
High Quality Natural (	Wetland -panne	Panne		SG	1984-12
Amphibian	<i>Ambystoma laterale</i>	Blue-spotted Salamander		SSC	1978-08
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1990-SU
Bird	<i>Rallus elegans</i>	King Rail		SE	1978-08
Bird	<i>Botaurus lentiginosus</i>	American Bittern		SE	1978-07
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1978-07-11
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1994-08-03
Reptile	<i>Clemmys guttata</i>	Spotted Turtle		SE	2005-06-05
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			1991-04-23
Reptile	<i>Clemmys guttata</i>	Spotted Turtle		SE	2009-06-28
Reptile	<i>Thamnophis proximus proximus</i>	Western Ribbon Snake		SSC	1987-06-06
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	2007-03-29
Insect Lepidoptera	<i>Euphyes dion</i>	Sedge Skipper		SR	2005

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Homoptera	<i>Paraphilaenus parallelus</i>	A Spittle Bug		ST	2005
Insect Homoptera	<i>Prairiana kansana</i>	The Kansas Prairie Leafhopper		SE	2005
Insect Homoptera	<i>Polyamia caperata</i>	Little Bluestem Polyamia		SR	2005
Insect Homoptera	<i>Philaenarcys killa</i>	Great Lakes dune spittlebug		SR	2005
Insect Homoptera	<i>Prosapia ignipectus</i>	Red-legged Spittle Bug		SR	2005
Insect Homoptera	<i>Flexamia pyrops</i>	The Long-nose Three-awn Leafhopper		SR	2005
Insect Homoptera	<i>Flexamia reflexus</i>	Indiangrass Flexamia		ST	2005
Insect Homoptera	<i>Bruchomorpha extensa</i>	The Long-nosed Elephant Hopper		SR	2005
Insect Lepidoptera	<i>Crambus bidens</i>			SR	2005
Insect Lepidoptera	<i>Papaipema pterisii</i>	Bracken Borer Moth		WL	2005
Insect Lepidoptera	<i>Papaipema speciosissima</i>	The Royal Fern Borer Moth		ST	2005
Insect Lepidoptera	<i>Phaneta olivaceana</i>			SR	2005
Insect Lepidoptera	<i>Phytometra ernestinana</i>	Ernestine's Moth		SE	1986-06-24
Insect Lepidoptera	<i>Oligia obtusa</i>	A Noctuid Moth		SE	2005
Insect Lepidoptera	<i>Pygarcia spraguei</i>	Sprague's Pygartic		SR	2005
Insect Lepidoptera	<i>Cycnia inopinatus</i>	The Unexpected Milkweed Moth		SR	2005
Insect Lepidoptera	<i>Melipotis jucunda</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Papaipema leucostigma</i>	Columbine Borer		ST	2005
Insect Lepidoptera	<i>Metanema determinata</i>	Dark Metanema		SR	2005
Insect Lepidoptera	<i>Capis curvata</i>	A Noctuid Moth		ST	2005
Insect Lepidoptera	<i>Meropleon ambifuscum</i>	Newman's Brocade		ST	2005
Insect Lepidoptera	<i>Melanomma auricinctaria</i>	Huckleberry Eye-spot Moth		SR	2002
Insect Lepidoptera	<i>Macrochilo louisiana</i>			ST	2005
Insect Lepidoptera	<i>Papaipema beeriana</i>	Beer's Blazing Star Borer Moth		ST	2005

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Protorthodes incincta</i>	Saturn quaker		SR	2005
Insect Lepidoptera	<i>Phaneta umbrastriana</i>			SR	2005
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	1985-06-29
Insect Lepidoptera	<i>Hypenodes caducus</i>	Large Hypenodes		SR	2005
Insect Lepidoptera	<i>Thorybes pylades</i>	Northern Cloudywing		SR	2005
Insect Lepidoptera	<i>Ancylis semiovana</i>			SR	2005
Insect Lepidoptera	<i>Hesperia ottoe</i>	Ottoe Skipper		SE	2005
Insect Lepidoptera	<i>Apamea burgessi</i>	A Noctuid Moth		ST	2005
Insect Lepidoptera	<i>Apamea nigrrior</i>	Black-dashed Apamea		SR	2005
Insect Lepidoptera	<i>Iodopepla u-album</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Anepia capsularis</i>	The Starry Campion Capsule Moth		SR	2005
Insect Lepidoptera	<i>Faronta rubripennis</i>	The Pine Streak		ST	2005
Insect Lepidoptera	<i>Grammia figurata</i>	The Figured Grammia		SR	2005
Insect Lepidoptera	<i>Eucosma fulminana</i>			SR	2005
Insect Lepidoptera	<i>Hesperia leonardus</i>	Leonard's Skipper		SR	2005
Insect Lepidoptera	<i>Eucrocnemis fimbriaris</i>	A Noctuid Moth		ST	2002
Insect Lepidoptera	<i>Agrotis vetusta</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Trichosilia manifesta</i>	The Record Keeper Moth		SR	2002
Insect Lepidoptera	<i>Grammia phyllira</i>	The Sand Barrens Grammia		SR	2005
Insect Lepidoptera	<i>Leucania linita</i>	Salt Marsh Wainscot		SR	2005
Insect Lepidoptera	<i>Archanara laeta</i>			ST	2005
Insect Lepidoptera	<i>Loxagrotis grotei</i>	Grote's Black-tipped Quaker		ST	2002
Insect Lepidoptera	<i>Lesmone detrahens</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Leucania inermis</i>	A Moth		SR	2005

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Rhodoecia aurantiago</i>	Aureolaria Seed Borer		ST	2005
Insect Lepidoptera	<i>Lycaena xanthoides</i>	Great Copper		SE	2002
Insect Lepidoptera	<i>Macrochilo absorptalis</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Macrochilo hypocritalis</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	2005
Insect Lepidoptera	<i>Schinia sanguinea</i>	Bleeding Flower Moth			1986
Insect Lepidoptera	<i>Lemmeria digitalis</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Semiothisa mellistrigata</i>	A Geometrid Moth		SR	2005
Insect Odonata	<i>Sympetrum semicinctum</i>	Band-winged Meadowhawk		SR	2005
Insect Orthoptera	<i>Psinidia fenestralis</i>	Sand Locust		SR	2005
Insect Orthoptera	<i>Paroxya atlantica</i>	A Grasshopper		ST	2005
Insect Orthoptera	<i>Phoetaliotes nebrascensis</i>	Large-headed Grasshopper		ST	2005
Insect Orthoptera	<i>Melanoplus keeleri luridus</i>	Keeler's Spur-throated Grasshopper		SR	2005
Insect Orthoptera	<i>Melanoplus fasciatus</i>	Huckleberry Spur-throat Grasshopper		SR	2005
Insect Orthoptera	<i>Orphulella pelidna</i>	Green Desert Grasshopper		SR	2005
Insect Orthoptera	<i>Conocephalus saltans</i>	Prairie Meadow Katydid		SR	2005
Insect Orthoptera	<i>Hesperotettix viridis pratensis</i>	A Grasshopper		SR	2005
Insect Orthoptera	<i>Pardalophora phoenicoptera</i>	Orange-winged Grasshopper		SR	2005
Vascular Plant	<i>Melampyrum lineare</i>	American Cow-wheat		SR	1907-07
Vascular Plant	<i>Orobancha fasciculata</i>	Clustered Broomrape		SE	1986-06-24
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	2004
Vascular Plant	<i>Carex garberi</i>	Elk Sedge		ST	1986-05
Vascular Plant	<i>Potamogeton pulcher</i>	Spotted Pondweed		SE	1897-06-21
Vascular Plant	<i>Carex eburnea</i>	Ebony Sedge		SR	1986-07-15

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Platanthera hyperborea</i>	Leafy Northern Green Orchis		ST	2008-07-03
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1987
Vascular Plant	<i>Cornus canadensis</i>	Bunchberry		SE	1878-05
Vascular Plant	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bract Green Orchis		ST	NO DATE
Vascular Plant	<i>Cirsium hillii</i>	Hill's Thistle		SE	1987-06-11
Vascular Plant	<i>Pinus banksiana</i>	Jack Pine		SR	2004
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	2004
Vascular Plant	<i>Thuja occidentalis</i>	Northern White Cedar		SE	1898-06-28
Vascular Plant	<i>Amelanchier humilis</i>	Running Serviceberry		SE	1985
Vascular Plant	<i>Eriophorum angustifolium</i>	Narrow-leaved Cotton-grass		SR	1986
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	2004
Vascular Plant	<i>Equisetum variegatum</i>	Variegated Horsetail		SE	1955-08-31
Vascular Plant	<i>Spiranthes lucida</i>	Shining Ladies'-tresses		SR	1934-06
Vascular Plant	<i>Aralia hispida</i>	Bristly Sarsaparilla		SE	1880-06
Vascular Plant	<i>Utricularia purpurea</i>	Purple Bladderwort		SR	2004
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	2004
Vascular Plant	<i>Tofieldia glutinosa</i>	False Asphodel		SR	1986-08-25
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1985-07-11
Vascular Plant	<i>Utricularia minor</i>	Lesser Bladderwort		ST	1897-06
Vascular Plant	<i>Utricularia cornuta</i>	Horned Bladderwort		ST	1916-08-26
Vascular Plant	<i>Eriophorum gracile</i>	Slender Cotton-grass		ST	1934-06
Vascular Plant	<i>Triglochin palustris</i>	Marsh Arrow-grass		SR	1896-08-28
Vascular Plant	<i>Satureja glabella</i> var. <i>angustifolia</i>	Calamint		SE	1926-09
Vascular Plant	<i>Linnaea borealis</i>	Twinflower		SX	1897-06-12

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Ludwigia sphaerocarpa</i>	Globe-fruited False-loosestrife		SE	1952-08-09
Vascular Plant	<i>Cypripedium candidum</i>	Small White Lady's-slipper		WL	1898-06
Vascular Plant	<i>Salix cordata</i>	Heartleaf Willow		ST	1898-06
Vascular Plant	<i>Buchnera americana</i>	Bluehearts		SE	2004
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	2004
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper		SR	1989-05-24
Vascular Plant	<i>Eleocharis geniculata</i>	Capitate Spike-rush		ST	1986
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	1985-07-11
Vascular Plant	<i>Arenaria stricta</i>	Michaux's Stitchwort		SR	2004
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-29
Vascular Plant	<i>Aristida intermedia</i>	Slim-spike Three-awn Grass		SR	1927-05-23
Vascular Plant	<i>Sisyrinchium montanum</i>	Strict Blue-eyed-grass		SE	1986
Vascular Plant	<i>Shepherdia canadensis</i>	Canada Buffalo-berry		SX	1997-07-22
Vascular Plant	<i>Juncus sCirpoides</i>	Scirpus-like Rush		ST	1985-07-11
Vascular Plant	<i>Scirpus subterminalis</i>	Water Bulrush		SR	1878-07-02
Vascular Plant	<i>Aster borealis</i>	Rushlike Aster		SR	1985-07-11
25					
High Quality Natural (Prairie -sand dry		Dry Sand Prairie		SG	1978-07
High Quality Natural (Prairie -sand dry-mesic		Dry-mesic Sand Prairie		SG	1978-07
High Quality Natural (Wetland -marsh		Marsh		SG	1978-07
High Quality Natural (Wetland -panne		Panne		SG	1978-07-11
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1978-07-11
Bird	<i>Chlidonias niger</i>	Black Tern		SE	1978-07-11
Bird	<i>Botaurus lentiginosus</i>	American Bittern		SE	1978-07

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Bird	<i>Rallus elegans</i>	King Rail		SE	1978-08
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1978-07
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1978-08
Vascular Plant	<i>Ceanothus herbaceus</i>	Prairie Redroot		SE	1903-05-30
Vascular Plant	<i>Eleocharis geniculata</i>	Capitate Spike-rush		ST	1991-08-12
Vascular Plant	<i>Cypripedium candidum</i>	Small White Lady's-slipper		WL	1897-05-29
Vascular Plant	<i>Eriophorum angustifolium</i>	Narrow-leaved Cotton-grass		SR	1982
Vascular Plant	<i>Comus rugosa</i>	Roundleaf Dogwood		SR	1920-07
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	1991-08-13
Vascular Plant	<i>Eriophorum gracile</i>	Slender Cotton-grass		ST	1934-06
Vascular Plant	<i>Orobancha fasciculata</i>	Clustered Broomrape		SE	1926-06-21
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper		SR	1978-01-25
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-29
Vascular Plant	<i>Spiranthes lucida</i>	Shining Ladies'-tresses		SR	1934-06-09
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1978-01-25
Vascular Plant	<i>Platanthera hyperborea</i>	Leafy Northern Green Orchis		ST	1978-01
Vascular Plant	<i>Arenaria stricta</i>	Michaux's Stitchwort		SR	1978-01-25
Vascular Plant	<i>Aristida intermedia</i>	Slim-spike Three-awn Grass		SR	1991-08-12
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1978-01-25
Vascular Plant	<i>Satureja glabella</i> var. <i>angustifolia</i>	Calamint		SE	1895-06-28
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	1923-07
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1956-06-26
Vascular Plant	<i>Pinus banksiana</i>	Jack Pine		SR	1978-07
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1991-08-29

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Utricularia minor</i>	Lesser Bladderwort		ST	1897-06
Vascular Plant	<i>Utricularia corn uta</i>	Horned Bladderwort		ST	1893-09-04
26					
High Quality Natural (Savanna -sand dry		Dry Sand Savanna		SG	1978-07
27					
High Quality Natural (Wetland -marsh		Marsh		SG	1978-07
High Quality Natural (Wetland -panne		Panne		SG	1978-07-11
Insect Odonata	<i>Sympetrum semicinctum</i>	Band-winged Meadowhawk		SR	1999
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-12
Vascular Plant	<i>Arenaria stricta</i>	Michaux's Stitchwort		SR	2008-06-10
Vascular Plant	<i>Aristida intermedia</i>	Slim-spike Three-awn Grass		SR	1986-12-16
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1991-08-12
Vascular Plant	<i>Aster sericeus</i>	Western Silvery Aster		SR	1978-11
29					
Vascular Plant	<i>Solidago simplex var. gillmanii</i>	Sticky Goldenrod		ST	1900-08-04
Vascular Plant	<i>Platanthera hookeri</i>	Hooker Orchis		SX	1893-06
Vascular Plant	<i>Lechea stricta</i>	Upright Pinweed		SX	1881-09-10
Vascular Plant	<i>Carex limosa</i>	Mud Sedge		SE	1895-06-30
Vascular Plant	<i>Talinum rugospermum</i>	Prairie Fame-flower		ST	1915-08-22
Vascular Plant	<i>Platanthera psycodes</i>	Small Purple-fringe Orchis		SR	1928-08-04
Vascular Plant	<i>Polygonella articulata</i>	Eastern Jointweed		SR	1955-08-31

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Map #					
30					
PINE STATION NATURE PRESERVE					
Vascular Plant	<i>Orobanche fasciculata</i>	Clustered Broomrape	|	SE	2006-05-28
31					
Bird	<i>Cistothorus palustris</i>	Marsh Wren	|	SE	2000-06-10
32					
PINE STATION NATURE PRESERVE					
Bird	<i>Ixobrychus exilis</i>	Least Bittern	|	SE	1991-06-08
Bird	<i>Rallus limicola</i>	Virginia Rail	|	SE	1991-05-14
Bird	<i>Cistothorus palustris</i>	Marsh Wren	|	SE	1991-07-29
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel	|	SE	2005*
Reptile	<i>Thamnophis proximus proximus</i>	Western Ribbon Snake		SSC	2005-09-20
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle	|	SE	2008-04-16
Reptile	<i>Sistrurus catenatus catenatus</i>	Eastern Massasauga	C	SE	1984
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			1990
Reptile	<i>Clemmys guttata</i>	Spotted Turtle	|	SE	2007-03-29
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1986
Insect Lepidoptera	<i>Capis curvata</i>	A Noctuid Moth		ST	1999
Vascular Plant	<i>Juncus balticus var. littoralis</i>	Baltic Rush		SR	1991-08-13
Vascular Plant	<i>Satureja glabella var. angustifolia</i>	Calamint	|	SE	2007-08-21
Vascular Plant	<i>Gentiana alba</i>	Yellow Gentian		SR	2008-09-09
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1991-08-13

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Tofieldia glutinosa</i>	False Asphodel		SR	1991-08-13
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1991-08-13
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	2007-08-21
Vascular Plant	<i>Eleocharis geniculata</i>	CaPitate Spike-rush		ST	1991-08-13
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1990
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-13
Vascular Plant	<i>Alnus rugosa</i>	Speckled Alder		WL	2008-07-09
Vascular Plant	<i>Buchnera americana</i>	Bluehearts		SE	2008-07-09
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	2007-09-04
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1991-06-14
Vascular Plant	<i>Melampyrum lineare</i>	American Cow-wheat		SR	1907-07-28
Vascular Plant	<i>Potamogeton pulcher</i>	Spotted Pondweed		SE	2000 Summ.
Vascular Plant	<i>Potamogeton pulcher</i>	Spotted Pondweed		SE	2007-05-10
Vascular Plant	<i>Carex garberi</i>	Elk Sedge		ST	1991-06-14
Vascular Plant	<i>Cirsium hillii</i>	Hill's Thistle		SE	1987
Vascular Plant	<i>Platanthera hyperborea</i>	Leafy Northern Green Orchis		ST	2008-06-17
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	1956-05-19
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper		SR	1989-05-24
Vascular Plant	<i>Carex brunnescens</i>	Brownish Sedge		SE	1991-08-08
33					
High Quality Natural (	Prairie -sand wet-mesic	Wet-mesic Sand Prairie		SG	1978-07-20
High Quality Natural (	Savanna -sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-20
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1994-06-03

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Map #					
34					
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	1994-07-28
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1994-06-03
35					
IVANHOE DUNE AND SWALE NATURE PRESERVE					
High Quality Natural (Savanna -sand mesic		Mesic Sand Savanna		SG	1978-07-23
High Quality Natural (Prairie -sand wet		Wet Sand Prairie		SG	1978-07-23
High Quality Natural (Prairie -sand dry-mesic		Dry-mesic Sand Prairie		SG	1978-07-23
High Quality Natural (Wetland -marsh		Marsh		SG	1978-07-23
High Quality Natural (Wetland -swamp shrub		Shrub Swamp		SG	1978-07-23
High Quality Natural (Savanna -sand dry-mesic		Dry-mesic Sand Savanna		SG	1978-07-23
Bird	<i>Certhia americana</i>	Brown Creeper			1991-05-01
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1991-04-18
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			1990
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	2008-07-18
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	1994-06-03
36					
IVANHOE DUNE AND SWALE NATURE PRESERVE					
High Quality Natural (Prairie -sand mesic		Mesic Sand Prairie		SG	1978-07-23
High Quality Natural (Lake -pond		Pond		SG	1978-07-23
High Quality Natural (Prairie -sand dry-mesic		Dry-mesic Sand Prairie		SG	1978-07

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
High Quality Natural (	Prairie -sand wet	Wet Sand Prairie		SG	1978-07
High Quality Natural (	Savanna -sand dry-mesic	Dry-mesic Sand Savanna		SG	1978-07-23
High Quality Natural (	Savanna -sand mesic	Mesic Sand Savanna		SG	1978-07-23
High Quality Natural (	Wetland -marsh	Marsh		SG	1978-07
High Quality Natural (	Wetland -swamp shrub	Shrub Swamp		SG	1978-07
Amphibian	<i>Ambystoma laterale</i>	Blue-spotted Salamander		SSC	2008-06-01
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	1991-11-01
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	1995-08-04
Vascular Plant	<i>Platanthera hyperborea</i>	Leafy Northern Green Orchis		ST	1985
Vascular Plant	<i>Diervilla lonicera</i>	Northern Bush-honeysuckle		SR	1985
Vascular Plant	<i>Prunus pensylvanica</i>	Fire Cherry		SR	1985
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	1985
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	1985

37

CLINE AVENUE NATURE PRESERVE

Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	2007-06-01
Insect Lepidoptera	<i>Papaipema leucostigma</i>	Columbine Borer		ST	2005
Insect Homoptera	<i>Graminella mohri</i>			SR	2005
Insect Homoptera	<i>Mesamia nigradorsum</i>	A Leafhopper		SR	2005
Insect Homoptera	<i>Prosapia ignipectus</i>	Red-legged Spittle Bug		SR	2005
Insect Homoptera	<i>Cosmotettix bilineatus</i>	Two-lined cosmotettix		ST	2005
Insect Homoptera	<i>Philaenarcys killa</i>	Great Lakes dune spittlebug		SR	2005
Insect Lepidoptera	<i>Semiothisa eremiata</i>	The Goat's Rue Looper		SR	2005

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Phaneta striatana</i>			SR	2005
Insect Lepidoptera	<i>Aethes patricia</i>			SE	2005
Insect Lepidoptera	<i>Papaipema maritima</i>	The Giant Sunflower Borer Moth		ST	2005
Insect Lepidoptera	<i>Croesia semipurpurana</i>			SR	2005
Insect Lepidoptera	<i>Eucosma fulminana</i>			SR	2005
Insect Lepidoptera	<i>Phaneta raracana</i>			SR	2005
Insect Lepidoptera	<i>Grammia phyllira</i>	The Sand Barrens Grammia		SR	2005
Insect Lepidoptera	<i>Macrochilo absorptalis</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Macrochilo hypocritalis</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Phaneta olivaceana</i>			SR	2005
Insect Lepidoptera	<i>Peoria gemmatella</i>	Gemmed Cordgrass Borer		SR	2005
Insect Lepidoptera	<i>Lycena helloides</i>	Purplish Copper		SR	2005
Insect Lepidoptera	<i>Protorthodes incincta</i>	Saturn quaker		SR	2005
Insect Lepidoptera	<i>Nola cilicoides</i>			SR	2005
Insect Lepidoptera	<i>Scirpophaga perstrialis</i>			SR	2005
Insect Lepidoptera	<i>Eucosma bilineana</i>			SR	2005
Insect Lepidoptera	<i>Poanes massasoit</i>	Mulberry Wing Skipper		SR	2005
Insect Lepidoptera	<i>Leucania linita</i>	Salt Marsh Wainscot		SR	2005
Insect Orthoptera	<i>Chloealtis conspersa</i>	Sprinkled Locust		SR	2005
Insect Orthoptera	<i>Conocephalus saltans</i>	Prairie Meadow Katydid		SR	2005
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	2007-06-26
38					
Insect Homoptera	<i>Chlorotettix fallax</i>	A Leafhopper		SR	2004-09-08

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Euphyes dion</i>	Sedge Skipper		SR	2004-07-09
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	2003-07-11
Insect Lepidoptera	<i>Papaipema lysimachiae</i>	The St. John'Swort Borer Moth		SR	2000-09-05
Insect Lepidoptera	<i>Macrochilo louisiana</i>			ST	2004-06-22
Insect Lepidoptera	<i>Sphinx luscitiosa</i>	The Luscious Willow Sphinx		SR	2004-06-24
Insect Lepidoptera	<i>Pyrausta laticlavia</i>	The Southern Purple Mint Moth		SR	2005-05-12
Insect Lepidoptera	<i>Spartiniphaga inops</i>	Spartina Borer Moth		SR	2004-09-04
Insect Orthoptera	<i>Neoconocephalus nebrascensis</i>	A Katydid		SR	2005-07-24
39					
CLINE AVENUE NATURE PRESERVE					
High Quality Natural (Prairie -sand dry-mesic		Dry-mesic Sand Prairie		SG	1978-07
High Quality Natural (Savanna -sand dry-mesic		Dry-mesic Sand Savanna		SG	1978-07-22
Vascular Plant <i>Diervilla lonicera</i>		Northern Bush-honeysuckle		SR	1978-07-22
40					
CLINE AVENUE NATURE PRESERVE					
High Quality Natural (Wetland -swamp shrub		Shrub Swamp		SG	1978-07
51					
Amphibian <i>Necturus maculosus</i>		Common mudpuppy		SSC	1986-07
Mammal <i>Spermophilus franklinii</i>		Franklin's Ground Squirrel		SE	1986-09-10
52					

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Map #					
IVANHOE SOUTH					
High Quality Natural (Savanna -sand dry-mesic		Dry-mesic Sand Savanna		SG	1978-07-10
High Quality Natural (Savanna -sand mesic		Mesic Sand Savanna		SG	1978-07-10
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	2007-07-15
53					
Vascular Plant	<i>Diervilla lonicera</i>	Northern Bush-honeysuckle		SR	1999-09-07
54					
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	1974-SU
55					
Vascular Plant	<i>Aristida tuberculosa</i>	Sea beach Needlegrass		SR	1952-09-21
Vascular Plant	<i>Selaginella rupestris</i>	Ledge Spike-moss		ST	1952-09
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1949-06
Vascular Plant	<i>Juncus scirpoides</i>	Scirpus-like Rush		ST	1952-07-27
Vascular Plant	<i>Carex garberi</i>	Elk Sedge		ST	1949-06
Vascular Plant	<i>Polygonella articulata</i>	Eastern Jointweed		SR	1952-09-21
70					
Bird	<i>Bartramia longicauda</i>	Upland Sandpiper		SE	1994-05-21
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			1905-06-12
71					

**Table 2. Rare, Threatened or endangered species occurring within BREEDING BIRD ATLAS BLOCK HIGHLAND-2
(Northeast Block of Highland Quadrangle)**

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Map #					
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1986-05-28
Insect Lepidoptera	<i>Hesperia ottoe</i>	Ottoe Skipper		SE	1995-07-08
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	1991-08-13
Vascular Plant	<i>Arctostaphylos uva-ursi</i>	Bearberry		SR	1991-08-13
Vascular Plant	<i>Tofieldia glutinosa</i>	False Asphodel		SR	1991-08-13
Vascular Plant	<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses		SE	1991-08-29
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	1991-08-13
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1991-08-13
Vascular Plant	<i>Pinus banksiana</i>	Jack Pine		SR	1991-08-29
Vascular Plant	<i>Carex crawei</i>	Crawe Sedge		ST	1991-06-13
Vascular Plant	<i>Agalinis skinneriana</i>	Pale False Foxglove		ST	1991-08-29
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1991-06-13
	72				
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	2007-07-12
Vascular Plant	<i>Sisyrinchium montanum</i>	Strict Blue-eyed-grass		SE	2007-07-12
Vascular Plant	<i>Rhus aromatica</i> var. <i>arenaria</i>	Beach Sumac		SR	2007-07-12

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Map #					
41					
TOLLESTON RIDGES NATURE PRESERVE					
High Quality Natural (Prairie -sand mesic		Mesic Sand Prairie		SG	1978-07-21
High Quality Natural (Savanna -sand dry-mesic		Dry-mesic Sand Savanna		SG	1978-07-21
High Quality Natural (Savanna -sand mesic'		Mesic Sand Savanna		SG	1978-07-21
High Quality Natural (Wetland -marsh		Marsh		SG	1978-07
Amphibian	<i>Ambystoma laterale</i>	Blue-spotted Salamander		SSC	2005-05-23
Bird	<i>Buteo lineatus</i>	Red-shouldered Hawk		SSC	1978-08
Bird	<i>Botaurus lentiginosus</i>	American Bittern		SE	1975
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1978
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	2007-06-10
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	2008-07-18
Insect Lepidoptera	<i>Satyroides eurydice</i>	Eyed Brown		SR	2008-07-10
Insect Lepidoptera	<i>Thorybes pylades</i>	Northern Cloudywing		SR	2008-07-18
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1978-08-11
Vascular Plant	<i>Carex richardsonii</i>	Richardson Sedge		ST	1980-05
Vascular Plant	<i>Diervilla lonicera</i>	Northern Bush-honeysuckle		SR	1991-08-10
Vascular Plant	<i>Solidago simplex</i> var. <i>gillmanii</i>	Sticky Goldenrod		ST	1978-08-11
Vascular Plant	<i>Spiranthes lucida</i>	Shining Ladies'-tresses		SR	1989
Vascular Plant	<i>Prunus pensylvanica</i>	Fire Cherry		SR	1978-08
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper		SR	2004

42

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED STATE	DATE
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel	SE	1992-08-09
43				
SEIDNER DUNE AND SWALE NATURE PRESERVE				
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel	SE	2002-09-04
Insect Lepidoptera	<i>Hesperia leonardus</i>	Leonard's Skipper	SR	2001
Insect Lepidoptera	<i>Grammia phyllira</i>	The Sand Barrens Grammia	SR	2001
Insect Lepidoptera	<i>Peoria gemmatella</i>	Gemmed Cordgrass Borer	SR	2001
Insect Lepidoptera	<i>Semiothisa eremiata</i>	The Goat's Rue Looper	SR	2001
44				
SEIDNER DUNE AND SWALE NATURE PRESERVE				
Insect Homoptera	<i>Cosmotettix bilineatus</i>	Two-lined cosmotettix	ST	2003
45				
SEIDNER DUNE AND SWALE NATURE PRESERVE				
Bird	<i>Cistothorus palustris</i>	Marsh Wren	SE	1987-06-06
Bird	<i>Chlidonias niger</i>	Black Tern	SE	1991-07-11
Bird	<i>Ardea alba</i>	Great Egret	SSC	1988-06-10
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush	SR	2001
46				
DuPont Dune & Swale Natural Area				

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
High Quality Natural (Wetland -marsh		Marsh		SG	1978-07
High Quality Natural (Wetland -meadow sedge		Sedge Meadow		SG	1978-07
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1991-07-11
Bird	<i>Cistothorus palustris</i>	Marsh Wren		SE	1991-09-15
Bird	<i>Botaurus lentiginosus</i>	American Bittern		SE	1991-07-11
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1991-07-11
Bird	<i>Chlidonias niger</i>	Black Tern		SE	1991-06-25
Bird	<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird		SE	1991-05-14
47					
DuPont Dune & Swale Natural Area					
Vascular Plant	<i>Gentiana alba</i>	Yellow Gentian		SR	2007-08-21
Vascular Plant	<i>Cirsium hillii</i>	Hill's Thistle		SE	2008-07-08
48					
DuPont Dune & Swale Natural Area					
High Quality Natural (Prairie -sand wet-mesic		Wet-mesic Sand Prairie		SG	1978-07
Reptile	<i>Clemmys guttata</i>	Spotted Turtle		SE	2005-09-14
Insect Homoptera	<i>Bruchomorpha dorsata</i>			SR	2005
Insect Lepidoptera	<i>Atrytonopsis hianna</i>	Dusted Skipper		ST	2005
Insect Homoptera	<i>Chlorotettix fallax</i>	A Leafhopper		SR	2005
Insect Lepidoptera	<i>Papaipema maritima</i>	The Giant Sunflower Borer Moth		ST	2005
Insect Lepidoptera	<i>Spartiniphaga inops</i>	Spartina Borer Moth		SR	2005
Insect Lepidoptera	<i>Pyrausta laticlavata</i>	The Southern Purple Mint Moth		SR	2005

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Papaipema beeriana</i>	Beer's Blazing Star Borer Moth		ST	2005
Insect Homoptera	<i>Bruchomorpha extensa</i>	The Long-nosed Elephant Hopper		SR	2005
Insect Lepidoptera	<i>Peoria tetradella</i>			SR	2005
Insect Homoptera	<i>Polyamia herbida</i>	The Prairie Panic Grass Leafhopper		ST	2005
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	2005
Insect Lepidoptera	<i>Platyperigea meralis</i>	The Rare Sand Quaker		ST	2005
Insect Lepidoptera	<i>Phytometra ernestianana</i>	Ernestine's Moth		SE	2005
Insect Lepidoptera	<i>Phaneta umbrastriana</i>			SR	2005
Insect Lepidoptera	<i>Phaneta olivaceana</i>			SR	2005
Insect Lepidoptera	<i>Macrochilo louisiana</i>			ST	2005
Insect Homoptera	<i>Prosapia ignipectus</i>	Red-legged Spittle Bug		SR	2005
Insect Homoptera	<i>Paraphlepsius maculosus</i>	Peppered Paraphlepsius Leafhopper		ST	2005
Insect Lepidoptera	<i>Faronta rubripennis</i>	The Pine Streak		ST	2005
Insect Lepidoptera	<i>Polites mystic</i>	Long Dash Skipper		SR	2005
Insect Homoptera	<i>Paraphlepsius lobatus</i>			ST	2005
Insect Lepidoptera	<i>Papaipema rigida</i>	A Borer Moth		SR	2005
Insect Homoptera	<i>Polyamia caperata</i>	Little Bluestem Polyamia		SR	2005
Insect Lepidoptera	<i>Protorthodes incincta</i>	Saturn quaker		SR	2005
Insect Lepidoptera	<i>Phaneta ochroterminana</i>			SR	2005
Insect Lepidoptera	<i>Tricholita notata</i>	Marked Noctuid		ST	2005
Insect Lepidoptera	<i>Ancylis semiovana</i>			SR	2005
Insect Lepidoptera	<i>Hyperaeschra georgica</i>	A Prominent Moth			2005
Insect Lepidoptera	<i>Grammia figurata</i>	The Figured Grammia		SR	2005
Insect Lepidoptera	<i>Leucania inermis</i>	A Moth		SR	2005

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED STATE	DATE
Insect Lepidoptera	<i>Tarachidia binocula</i>	Prairie tarachidia		2005
Insect Lepidoptera	<i>Grammia virguncula</i>		SR	2005
Insect Lepidoptera	<i>Eucosma bilineana</i>		SR	2005
Insect Lepidoptera	<i>Lemmeria digitalis</i>	A Noctuid Moth	SR	2005
Insect Homoptera	<i>Laevicephalus acus</i>		SR	2005
Insect Lepidoptera	<i>Speyeria aphrodite</i>	Aphrodite Fritillary	WL	2005
Insect Lepidoptera	<i>Eucosma giganteana</i>		SR	2005
Insect Lepidoptera	<i>Erynnis persius persius</i>	Persius Dusky Wing	SE	2005
Insect Lepidoptera	<i>Hesperia leonardus</i>	Leonard's Skipper	SR	2005
Insect Lepidoptera	<i>Agrotis vetusta</i>	A Moth	SR	2005
Insect Lepidoptera	<i>Trichosilia manifesta</i>	The Record Keeper Moth	SR	2005
Insect Orthoptera	<i>Hesperotettix viridis pratensis</i>	A Grasshopper	SR	2005
Insect Lepidoptera	<i>Agrotis stigmata</i>		ST	2005
Insect Orthoptera	<i>Trimerotropis maritima</i>	The Dune Locust	ST	2005
Insect Lepidoptera	<i>Iodopepla u-album</i>	A Noctuid Moth	SR	2005
Insect Lepidoptera	<i>Hypenodes caducus</i>	Large Hypenodes	SR	2005
Insect Lepidoptera	<i>Eucrocnemis fimbriaris</i>	A Noctuid Moth	ST	2005
Insect Lepidoptera	<i>Metanema determinata</i>	Dark Metanema	SR	2005
Insect Lepidoptera	<i>Oncocnemis riparia</i>	The Dune Oncocnemis Moth	ST	2005
Insect Homoptera	<i>Flexamia reflexus</i>	Indiangrass Flexamia	ST	2005
Insect Lepidoptera	<i>Oligia obtusa</i>	A Noctuid Moth	SE	2005
Insect Lepidoptera	<i>Notodonta scitipennis</i>	A Notodontid Moth		2005
Insect Lepidoptera	<i>Coenochroa illibella</i>	Dune Panic Grass Moth	SR	2005
Insect Lepidoptera	<i>Aethes patricia</i>		SE	2005

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Insect Lepidoptera	<i>Leucania linia</i>	Salt Marsh Wainscot		SR	2005
Insect Lepidoptera	<i>Spilosoma latipennis</i>	The Red-legged Tussock Moth		SR	2005
Insect Odonata	<i>Sympetrum semicinctum</i>	Band-winged Meadowhawk		SR	2005
Insect Lepidoptera	<i>Meroplen ambifusum</i>	Newman's Brocade		ST	2005
Insect Lepidoptera	<i>Apamea nigror</i>	Black-dashed Apamea		SR	2005
Insect Lepidoptera	<i>Acronicta dactylina</i>			SR	2005
Insect Lepidoptera	<i>Cynia inopinatus</i>	The Unexpected Milkweed Moth		SR	2005
Insect Lepidoptera	<i>Macrochilo hypocritalis</i>	A Noctuid Moth		SR	2005
Insect Lepidoptera	<i>Macrochilo absorptalis</i>	A Moth		SR	2005
Insect Lepidoptera	<i>Anepia capsularis</i>	The Starry Champion Capsule Moth		SR	2005
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	2008-07-09
Insect Lepidoptera	<i>Fagitana littera</i>	The Marsh Fern Moth		ST	2005
Insect Orthoptera	<i>Conocephalus saltans</i>	Prairie Meadow Katydid		SR	2005

49

DuPont Dune & Swale Natural Area

High Quality Natural (Prairie -sand dry-mesic)		Dry-mesic Sand Prairie		SG	1978-07
High Quality Natural (Savanna -sand dry)		Dry Sand Savanna		SG	1978-07
Bird	<i>Rallus elegans</i>	King Rail		SE	1974-05-22
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1990-07-06
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	1991
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1991-07-02
Vascular Plant	<i>Eriophorum angustifolium</i>	Narrow-leaved Cotton-grass		SR	1991
Vascular Plant	<i>Carex bebbii</i>	Bebb's Sedge		ST	1991

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Vascular Plant	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush		SR	1991
Vascular Plant	<i>Selaginella apoda</i>	Meadow Spike-moss		WL	1991
Vascular Plant	<i>Solidago ptarmicoides</i>	Prairie Goldenrod		SR	1992-08-22
50					
DuPont Dune & Swale Natural Area					
Vascular Plant	<i>Orobancha fasciculata</i>	Clustered Broomrape		SE	2007-05-28
58					
Insect Lepidoptera	<i>Metarranthia apiciaria</i>	Barrens Metarranthia Moth		SE	1904-07-01
Insect Coleoptera	<i>Nicrophorus americanus</i>	American Burying Beetle	LE	SX	1896
66					
High Quality Natural (Prairie -sand dry-mesic)		Dry-mesic Sand Prairie		SG	1981-08-15
67					
High Quality Natural (Savanna -sand dry-mesic)		Dry-mesic Sand Savanna		SG	1981-10-02
68					
ROXANA MARSH					
Amphibian	<i>Rana pipiens</i>	Northern Leopard Frog		SSC	1984
Bird	<i>Rallus limicola</i>	Virginia Rail		SE	1982-07-20
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1984-06-28

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Bird	<i>Chlidonias niger</i>	Black Tern		SE	1989-06-24
Bird	<i>Cistothorus palustris</i>	Marsh Wren		SE	1985-07
Bird	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron		SE	1986-06-28
Bird	<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird		SE	1986-06-21
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1985-07-02
69					
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1992-08-05
Reptile	<i>Emydoidea blandingii</i>	Blanding's Turtle		SE	1999-03*
73					
Amphibian	<i>Rana pipiens</i>	Northern Leopard Frog		SSC	1923-06-30
Insect Lepidoptera	<i>Schinia indiana</i>	Phlox Moth		SE	1940-05
74					
GIBSON WOODS NATURE PRESERVE					
High Quality Natural (Forest -floodplain wet-mesic		Wet-mesic Floodplain Forest		SG	1978-07
High Quality Natural (Wetland -swamp shrub		Shrub Swamp		SG	1978-07
High Quality Natural (Wetland -marsh		Marsh		SG	1978-07
High Quality Natural (Prairie -sand wet-mesic		Wet-mesic Sand Prairie		SG	1978-07-21
High Quality Natural (Prairie -sand dry-mesic		Dry-mesic Sand Prairie		SG	1978-07
High Quality Natural (Savanna -sand dry-mesic		Dry-mesic Sand Savanna		SG	1978-07-21
Bird	<i>Ixobrychus exilis</i>	Least Bittern		SE	1985-07-02
Mammal	<i>Spermophilus franklinii</i>	Franklin's Ground Squirrel		SE	1994-07-27

**Table 3. Rare, threatened and endangered species within BREEDING BIRD ATLAS BLOCK HIGHLAND-1
(Northwest Block of Highland Quadrangle).**

TYPE_ Map #	SPECIES NAME	COMMON NAME	FED	STATE	DATE
Reptile	<i>Thamnophis proximus proximus</i>	Western Ribbon Snake		SSC	1991
Reptile	<i>Ophisaurus attenuatus attenuatus</i>	Western Slender Glass Lizard			2005-06-03
Insect Lepidoptera	<i>Euchloe olympia</i>	Olympia Marble		ST	1990-04-25
Insect Lepidoptera	<i>Papaipema pterisii</i>	Bracken Borer Moth		WL	1992-07-09
Insect Lepidoptera	<i>Problema byssus</i>	Bunchgrass Skipper		ST	1990
Insect Lepidoptera	<i>Papaipema leucostigma</i>	Columbine Borer		ST	1990-09-11
Insect Lepidoptera	<i>Lycaeides melissa samuelis</i>	Karner Blue	LE	SE	1992-07-09
Vascular Plant	<i>Juglans cinerea</i>	Butternut		WL	1989
Vascular Plant	<i>Rhus aromatica</i> var. <i>aromatica</i>	Beach Sumac		SR	1989
Vascular Plant	<i>Prunus pensylvanica</i>	Fire Cherry		SR	1989-05-12
Vascular Plant	<i>Satureja glabella</i> var. <i>angustifolia</i>	Calamint		SE	1906-08
Vascular Plant	<i>Carex aurea</i>	Golden-fruited Sedge		SR	1978-01-25
Vascular Plant	<i>Corydalis sempervirens</i>	Pale Corydalis		ST	2008-05-22
Vascular Plant	<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	Small Yellow Lady's-slipper		SR	1991-08-10
Vascular Plant	<i>Diervilla lonicera</i>	Northern Bush-honeysuckle		SR	1991-08-10

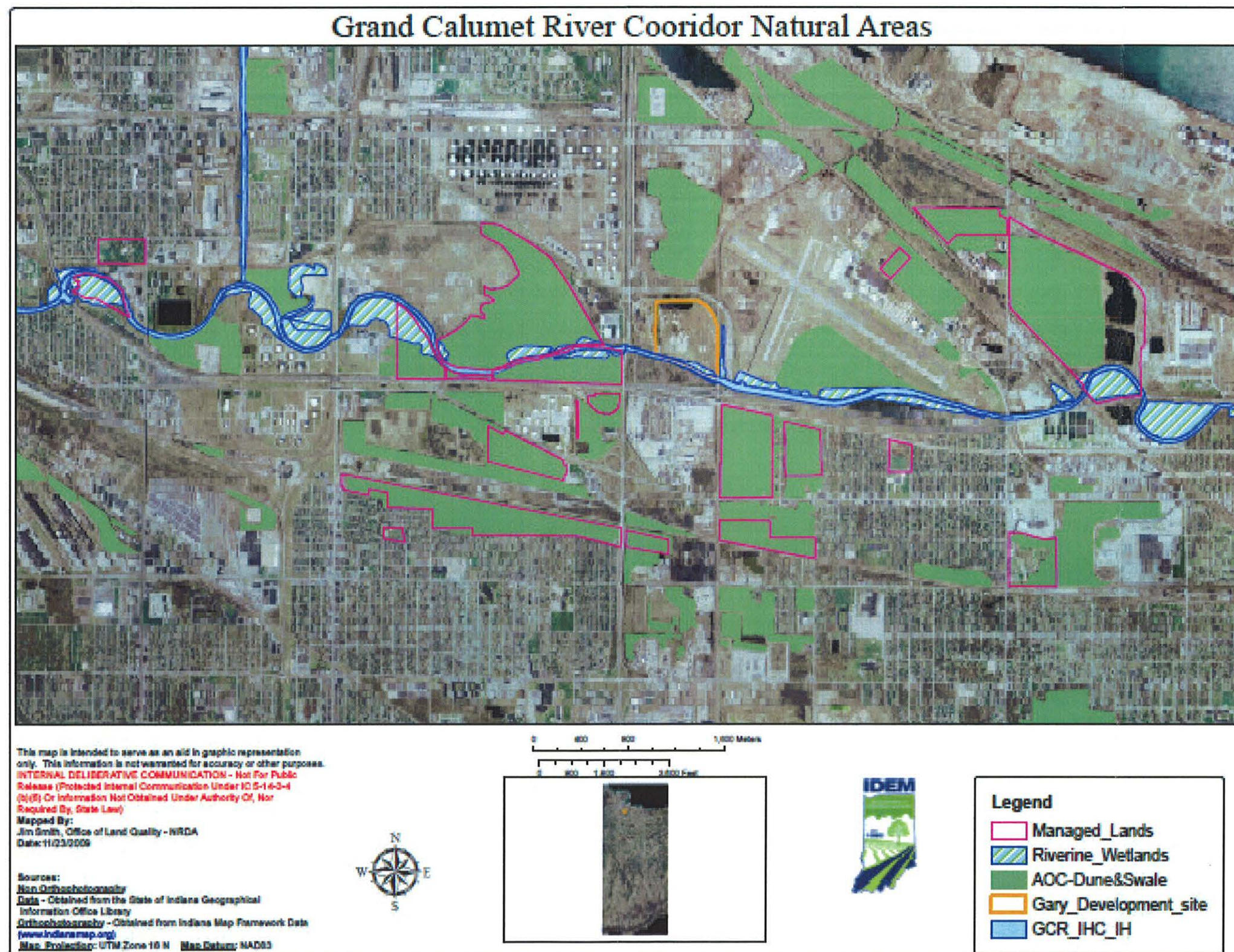





Figure 1. Natural features along the Grand Calumet River which provide a unique habitat corridor from Gary to Hammond, Indiana.



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Indiana 2005-2010

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Results by Block

Draft Results Summary for 8322/ Highland - 2 (Lake)

All results DRAFT until final review / publication. [select another block](#)

SUMMARY:
1 total species: 1 CO,
3 species in IN1985

Results last updated: 25 Nov 2009

Species List

Species	Best Evidence	Other details	IN1985
Pied-billed Grebe	● CO FL		
Killdeer			● CO
Upland Sandpiper			● CO
Bell's Vireo			⊗ PO

Arrangement of blocks:

1 (NW)	2 (NE)
3 (CW)	4 (CE)
5 (SW)	6 (SE)

select a block

(select a Quad first)

OR block code:

'Quad' is used here for topographic quads or other larger units containing survey blocks.

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Related topics: [Results for Lake County](#)

Help & Hints for atlases in progress

- Only reviewed data are shown in public results.
- This page may show no results (0 species) for the current atlas, but have lots of results from a previous atlas.
- For atlas participants, the Block Sightings Detail Report may be more useful and includes all species, even those not finalized or reviewed.

[Patuxent Wildlife Research Center](#), part of the [U.S. Geological Survey](#) (USGS), and [National Biological Information Infrastructure](#) provide the BBA (Breeding Bird Atlas) Explorer in cooperation with the atlas project sponsors.

Figure 2. Breeding Bird Atlas 2005 – 2010 draft results for Highland-2 Block.

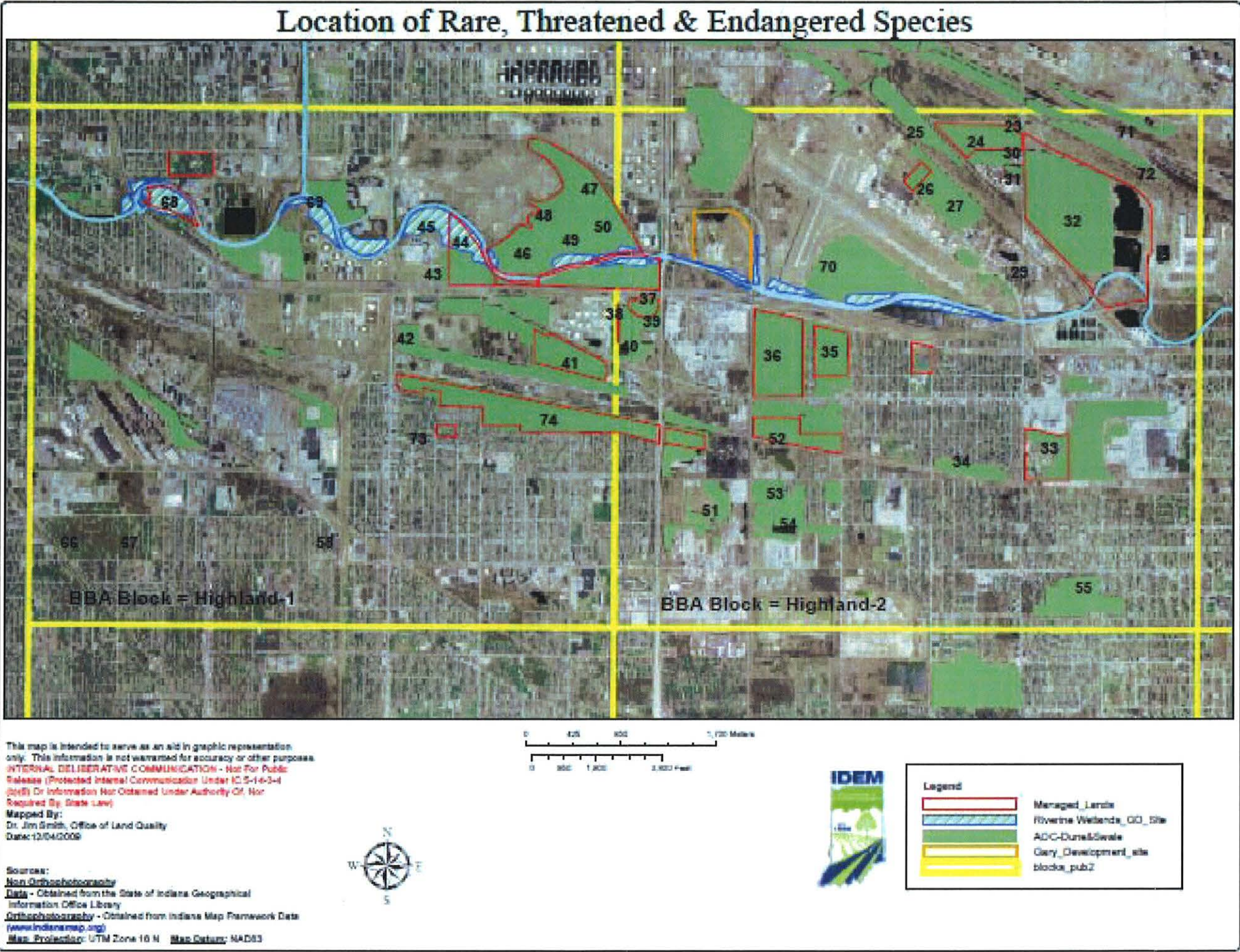


Figure 3. General locations of rare, threatened and endangered species within Breeding Bird Atlas Blocks Highland-1 and Highland-2, Hammond and Gary, Lake County, Indiana.

USGS

North American
BBA Explorer

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Results by Block

Draft Results Summary for 8321/ Highland - 1 (Lake)

All results DRAFT until final review / publication.

SUMMARY:

0 total species:

6 species in IN1985

Results last updated: No results so far for current atlas block.

[select another block](#)

Species List			
Species	Best Evidence	Other details	IN1985
Least Bittern			⊗ PO
Common Moorhen			● CO
American Coot			● CO
Black Tern			● CO
Marsh Wren			① PR
Yellow-headed Blackbird			① PR

Arrangement of blocks:

1 (NW)	2 (NE)
3 (CW)	4 (CE)
5 (SW)	6 (SE)

select a block

(select a Quad first)

OR block code:

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Help & Hints for atlases in progress

- Only *reviewed* data are shown in public results.
- This page may show no results (0 species) for the current atlas, but have lots of results from a previous atlas.
- For atlas participants, the Block Sightings Detail Report may be more useful and includes all species, even those not finalized or reviewed.

Figure 4. Breeding Bird Atlas 2005 – 2010 draft results for Highland-1Block.

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(<http://www.in.gov/legislative/iac/20070815-IR-312070469NRA.xml.html>).
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- Rothrock, P. E. 2007b. Status of Lacustrine/Palustrine Plant Communities of the Grand Calumet River, Lake County, Indiana Based upon Two Rapid Assessment Methodologies. Report prepared for Indiana Natural Resource Trustees under U.S. Fish and Wildlife Service agreement #301816J041. 121 p.
- Smith, J. R. 2009. Gary Development Landfill Site HRS – Particular Areas, Relatively Small in Size, Important to Maintenance of Unique Biotic Communities. Memorandum prepared for Indiana Department Environmental Management, Site Investigation, November, 2009. 12 p.

State Form 4336

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: March 26, 2010

TO: Jaworski, Mark, OLQ SI THRU: Admire, Beth, OLC
Hauer, Gabriele, OLQ SI

FROM: Smith, Jim R., OLC, NRDA

SUBJECT: Gary Development Landfill Site, Gary, Lake County, Indiana
Modification of December 9, 2009 Memorandum

The Indiana Department Environmental Management (IDEM) Natural Resource Damages (NRD) Program was asked to respond to questions and provide updates to the rare, threatened or endangered species memorandum produced on December 9, 2009 for the Gary Development Landfill site. Specific comment to be addressed was:

Smith 12/9/09 Memo:

*Subject Line needs to be changed from USS Lead to Gary Development
Some of the species listed in the IN1985 BBA are not listed in the
IN2005 BBA. Why should we be considering the IN1985 species as
affected sensitive environments?
Please make sure the natural areas being evaluated are contiguous to
the Grand Calumet River. The initial review with the B&W maps
concluded that the Natural Areas to be included are
43,44,45,46,47,48,49,50 and 70.*

Response: After discussion with U.S. EPA staff the following were determined: subject line has been corrected as reflected in attachment of corrected memorandum. IN1985 BBA is currently being updated by Indiana Department of Natural Resources; however, BBA Block Highland-2, which contains the Gary Development site is not a primary Block being evaluated. The BBA Block, Highland-1 which is immediately west of the Gary Development site is the primary BBA Block and only incidental observations from Block Highland-2 would be included in the 2005-2011 update. To date, no updates to the IN2010 BBA have been recorded or posted to the website. NRD Program staff was requested to evaluate Rare, Threatened and Endangered Species within the BBA Blocks relative to the Gary Development Landfill. Tables 2 and 3 of the attached December 9, 2009 Memorandum provides a listing of these species within the BBA Blocks Highland-1 and Highland-2: species are listed by occurrence on Natural Areas within the respective blocks (see map numbers in Figure 3 for specific locations). Figures 2 and 3 have

been modified to reflect clarifying suggestions. These Figures have been replaced in the attached memo and are attached as separate PDF files for ease of transmittal as color copies to U.S. EPA. Table 1 of the memo lists all occurrences of Rare, Threatened and Endangered species within 1.5 miles of the Gary Development Landfill site (Figure 3 was modified to reflect this buffer around the site).

Attachments (3)

State Form 4336

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: May 21, 2010

TO: Jaworski, Mark; OLQ SI THRU: Admire, Beth; OLC
Hauer, Gabriele; OLQ SI

FROM: Smith, Jim R., OLQ, NRD Program

SUBJECT: Gary Development Landfill Site, Gary, Lake County, Indiana
Addendum 2 of December 9, 2009 Memorandum

Indiana Department of Environmental Management Natural Resource Damage Program was requested to provide additional information regarding Endangered Species potential use of the Gray Development Site. Specifically:

Information should be added to the 2009 Memorandum indicating the sensitive environment was 1) suitable as habitat for [the Marsh Wren] before the habitat was impacted by releases from the site; 2) would be conducive to this species again (this particular species); and 3) is within the range of the particular species identified.

Comments are addressed by the following additions to the 2009 Memorandum:

1) Gary Development Landfill site provided suitable habitat for Marsh Wrens prior to its development.

As late as 1954 (Figure 1) the area currently occupied by Gary Development Site landfill consisted of native dune and swale habitat. Areas adjacent to the Grand Calumet River and deeper swales provided environments suitable to growth of cattails, rushes and other aquatic plants extensively utilized by Marsh Wren for nesting and feeding habitats (Bacone 1980, Labus 1997). Butler (1898) referred to the Marsh Wren as an abundant resident of Indiana's marshes with *Cistothorus palustris* [Marsh Wren] surely nesting at every site that provided the requisite cattail stands (quoted in Brock 1997 and 1999-2000). Brock (1986) found the Marsh Wren to be a summer resident and transient through the Dunes and "... is found almost anywhere cattails grow in abundance."

Marsh Wrens prefer wetland habitats featuring dense cattails (*Typha angustifolia* or *Typha x glauca*), reeds (*Phragmites australis*) and bulrush (*Schoenoplectus tabernaemontani*). Emergent vegetation is the most significant component of nesting habitat for Marsh Wrens (Reeb, et al. 2007). They inhabit freshwater marshes, roadside ditches, and small runoff sites, and will even nest in invasive plants such as purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), and reed-canary grass (*Phalaris arundinacea*). In winter, they frequent a wider variety of habitats, including wet meadows (Seattle Audubon 2005-2008). Marsh Wrens eat mainly invertebrates, especially spiders and insects including bees, ants, wasps, beetles, dragonflies, damselflies and moths. Marsh Wrens forage on or near the marsh floor, gleaning insects from stems and leaves of vegetation and from the water's surface. Some also forage in thickets or shrub patches that occur near the marsh (Castrale, Hopkins and Keller 1998; Reeb, et al. 2007).

Most riverine and all other suitable Marsh Wren habitat was destroyed during initial sand mining and subsequent land filling activities at the Gary Development site (Figures 2 – 6). Contaminants associated with river sediments and released from the Gary Development Landfill site have continued to depress suitability of the little remaining habitat at this site.

2. Gary Development Site would be conducive to providing habitat for the Marsh Wren after remediation

Keating (ca 2006) writing for the U.S. Environmental Protection Agency Great Lakes National Program Office and Environment Canada Great Lakes and Corporate Affairs Branch has documented that recently indicated reductions in the use of chemicals that damage the ability of many wildlife species to reproduce has resulted in resurgence of populations of Bald Eagles (*Haliaeetus leucocephalus*), and other species, but that populations of black terns (*Chlidonias niger*), American coot (*Fulica Americana*), **Marsh Wren** [emphasis added], and other species are declining, largely because of loss of wetlands and other important habitat.

Remediation of the Gary Development Landfill site in a manner that would provide for the mitigation of wetland habitat along the north bank of the Grand Calumet River, along the drainage ditch running along the eastern edge of the site and restoration of contaminated habitat associated with the northern wetland pond would enhance habitat for the Marsh Wren. Common Reed and cattails are currently part of flora of the riverine wetlands (Rothrock, 2007). Remediation and restoration of the wetlands to reduce common reed, and increase occurrence of bulrush would enhance Marsh Wren use of the restored habitat.

3. Gary Development Landfill is within the range of the Marsh Wren

The Marsh Wren breeds from British Columbia, central interior Canada, Manitoba, and Nova Scotia south to Mexico, the Gulf coast, and Florida and spends winters across the southern tier of the United States, north to Washington on the west coast and to New Jersey on the east coast and south into Central America (Whatbird.com 2002-2007; Peterson 1980; and Castrale, Hopkins

and Keller 1998). Castrale, et al. (1998) found that Atlas blocks with Marsh Wren were primarily restricted to the northern quarter of Indiana and were reported on Summer Bird Counts in most of the state, but extremely rare in all regions except for northern Indiana.

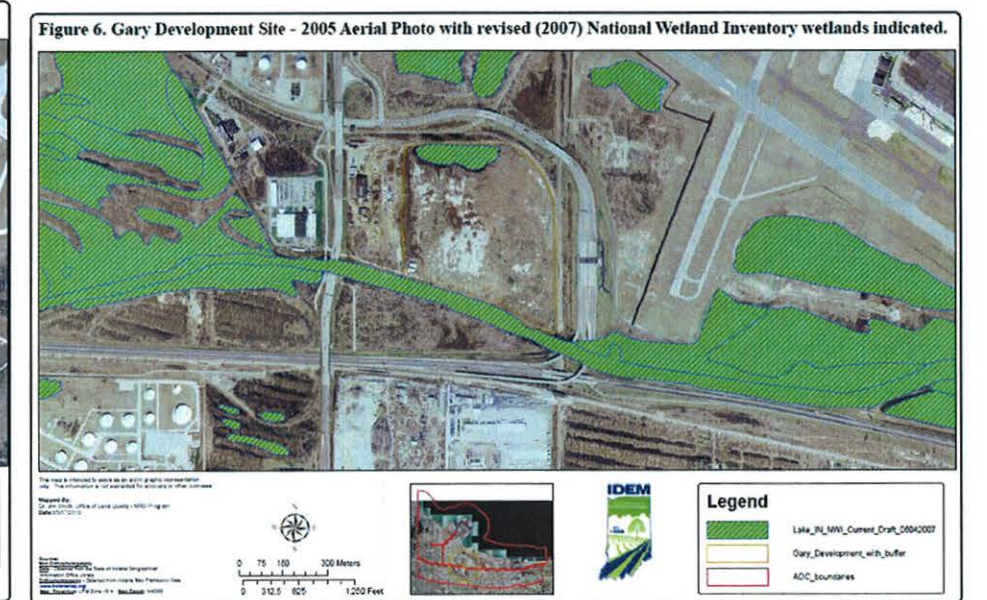
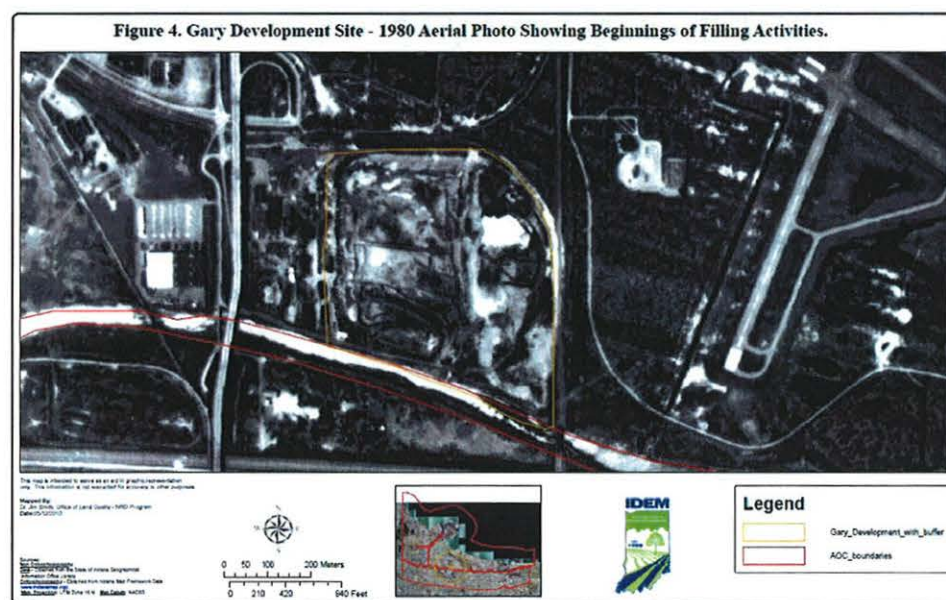
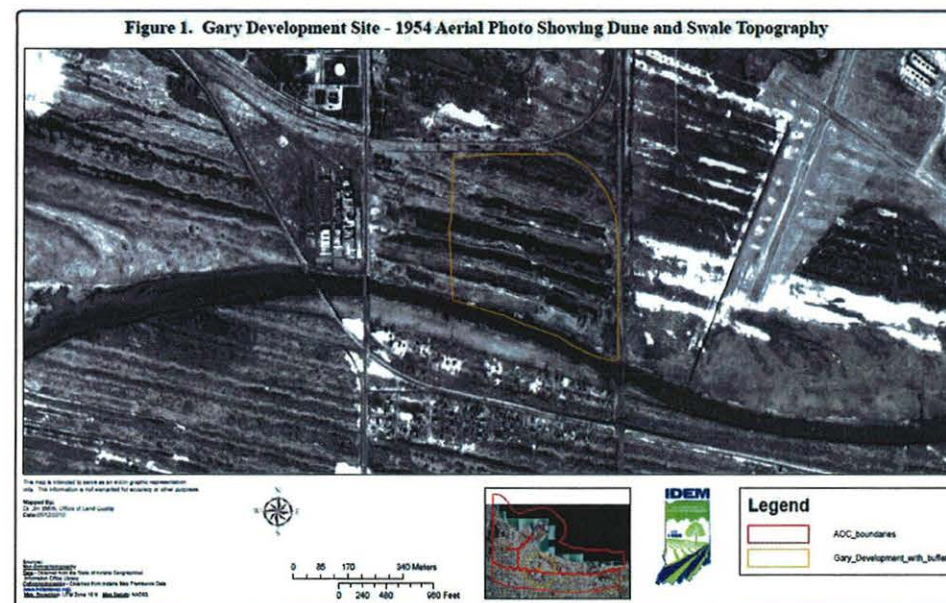
The Gary Development Landfill Site is within the range of the Marsh Wren within the State of Indiana, in the Midwest and in its National/International summer and breeding range of the Marsh Wren.

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Figures 1 – 6. Gary Development Site – Aerial photographs illustrate pre-development habitat (Figure 1) in 1954, early (Figure 2) and late sand mining activities (Figure 3), industrial filling (Figure 4), and post filling at the site (Figures 5 and 6).

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: November 24, 2009

TO: Jaworski, Mark, OLQ SI

THRU: Admire, Beth, OLC
Hauer, Gabriele, OLQ SI

FROM: Smith, Jim R., OLQ, NRDA

SUBJECT: Gary Development Landfill Site HRS – Particular Areas, Relatively Small in Size,
Important to Maintenance of Unique Biotic Communities,

and Bibliographic Information on Dr. Jim Smith (attached as Appendix A)

Particular Areas, Relatively Small in Size, Important to Maintenance of Unique Biotic Communities are: "Areas that are important for the maintenance of unique, rare, or otherwise ecologically valuable biotic communities. . . . [including] . . . Areas with a high proportion of species with highly restrictive habitat requirements due to unusual natural biotic and/or abiotic conditions; highly isolated area that may not have an unusual community structure per se, but because of its geographic isolation is particularly important to the continued existence of that community; areas with a high proportion of species that are locally endemic because of a relatively long period of geographical isolation and/or exceptional examples of "climax" communities because of minimal human disturbance; or areas vital for a species that are important to the maintenance of a community" (US EPA 1992).

The Gary Development Landfill site provides several of these functions to the Grand Calumet River Corridor providing a continuity to riverine wetlands, natural areas (some protected by State ownership, dedicated Natural Areas, sensitive biotic communities and globally rare Dune and Swale habitat) (see Figure 1 below) for details of Grand Calumet River Corridor communities). Clean up and restoration of riverine wetlands and protection of the corridor adjacent to south of the Gary Development Landfill site will provide and enhance a link between rare and fragmented habitats along the river corridor. The following text, Table 1, and Figure 1 provide details of community and habitat components that provide evidence of unique function of corridor connectivity that the Gary Development Landfill site serves, meeting many of the definition requirements listed above for this Sensitive Environment type.

Threatened & Endangered Species

The Indiana Department of Natural Resources Heritage Database contains a list of several hundred potentially endangered, threatened, rare, of special concern, extirpated, and watch list species that

occur in Lake County, Indiana. Of those species in Lake County, a small subdivision occurs or potentially could occur within the Grand Calumet River-Indiana Harbor Canal Area of Concern (GCR-IHC). Table 1 provides a summary of county/GCR-IHC Rare and Endangered species in the database.

Table 1. Summary of Endangered, Threatened and Rare species in Grand Calumet River – Indiana Harbor Canal Area of Concern, Lake County Indiana.

Group	LE	LT	C	PDL	SE	ST	SR	SSC	SX	SG	WL
Plant		2			31	23	38		6		4
Plant Community											13
Mollusk											
Insect ¹	3				5	8	7		2		1
Fish					1						
Amphibian								3			
Reptile			1		4			4			
Bird	1	1		3*	13			3	1		
Migratory Bird Area											
Mammal					1						

Federal Listings: LE – Endangered; LT- Threatened; C – Candidate; PDL – Proposed for delisting

State Listings: SE – Endangered; ST – Threatened; SR – Rare; SSC – Special Concern; SX – Extirpated; WL – Watch List; SG – Special Group

* Birds have been delisted by USFWS and have no current ESA status

¹ Insect surveys in 2005 and 2008 has significantly increased the number of State Rare, State Threatened and State Endangered Insects in the AOC. The added species are included in the listing below this Table.

Of those rare, threatened or endangered species that occur in the GCR-IHC AOC (Hellmich, 2009), the following have been recorded within ½ mile of Grand Calumet River Corridor between Gary and Hammond (see Figure 1 for area of consideration):

Insects

- *Acronicta dactylina* (none) - SR
- *Aethes patricia* (none) – SE
- *Agrotis stigmata* (none) - ST
- *Agrotis vetusta* (A Moth) - SR
- *Ancylis semiovana* (none) – SR
- *Anepia capsularis* (The Starry Campion Capsule Moth) - SR
- *Apamea nigrrior* (Black-dashed Apamea) - SR
- *Atrytonopsis hianna* (Dusty Skipper) – ST
- *Bruchomorpha dorsata* (none) – SR
- *Bruchomorpha extensa* (Long-nosed Elephant Hopper) – SR
- *Capis curvata* (A Noctuid Moth) - ST
- *Chloealtis conspersa* (Sprinkled Locust) – SR
- *Chlorotettix fallax* (A Leafhopper) - SR
- *Conocephalus saltans* (Prairie Meadow Katydid) – SR
- *Coenochroa illibella* (Dune Panic Grass Moth) - SR
- *Cosmotettix bilineatus* (Two-lined Cosmotettix) - ST
- *Croesia semipurpurana* (Oak Lieftier) – SR
- *Cycnia inopinatus* (The Unexpected Milkweed Moth) – SR
- *Erynnis persius persius* (Persius Dusky Wing) – SR
- *Eucrotopcnemis fimbriaris* (A Noctuid Moth) - ST

- *Eucosma bilineana* (none) - SR
- *Eucosma fulminana* (none) - SR
- *Eucosma giganteana* (none) - SR
- *Euphyes dion* (Sedge Skipper) - SR
- *Fagitana littera* (The Marsh Fern Moth) - ST
- *Faronta rubripennis* (The Pine Streak) - ST
- *Flexamia reflexus* (Indiangrass Flexamia) - ST
- *Grammia figurate* (The Figured Grammia) - SR
- *Grammia mohri* (none) - SR
- *Grammia oithona* (Oithona's Grammia) - SR
- *Grammia phyllira* (Sand Barrens Grammia) - SR
- *Grammia virguncula* (none) - SR
- *Hesperia leonardus* (Leonard's Skipper) - SR
- *Hesperptettix viridis pratensis* (A Grasshopper) - SR
- *Hypenodes caducus* (Large Hypenodes) - SR
- *Hyperaeschra georgica* (Georgian Prominent Moth) - **
- *Laevicephalus acus* (none) - SR
- *Lemmeria digitalis* (A Noctuid Moth) - SR
- *Leucania inermis* (A Moth) - SR
- *Leucania linita* (Salt Marsh Wainscot) - SR
- *Lodopepla u-album* (A Noctuid Moth) - SR
- *Lycaeides melissa samuelis* (Karner Blue Butterfly) - SE, LE
- *Lycaena helloides* (Purplish Copper) - SR
- *Macrochilo absorptalis* (A Moth) - SR
- *Macrpchilo hypocriticalis* (A Noctuid Moth) - SR
- *Macrochilo louisiana* (none) - ST
- *Meropleon ambifusum* (Newman's Brocade) - ST
- *Mesamia nigradorsum* (A Leafhopper) - SR
- *Metanema determinate* (Dark Metanema) - SR
- *Neoconocephalus nebrascensis* (A Katydid) - SR
- *Nola cilicoides* (none) - SR
- *Notodonta scitipennis* (A Notodontid Moth) - **
- *Oligia obtuse* (A Noctuid Moth) - SE
- *Oncocnemis riparia* (The Dune Oncocnemis Moth) - ST
- *Papaipema berriana* (Beer's Blazing Star Borer Moth) - ST
- *Papaipema leucostigma* (Columbine Borer) - ST
- *Papaipema lysimachiae* (St. John'swort Borer Moth) - SR
- *Papaipema maritime* (Giant Sunflower Borer Moth) - ST
- *Papaipema rigida* (A Borer Moth) - SR
- *Paraphlepsius lobatus* (none) - ST
- *Paraphlepsius maculosus* (Peppered Paraphlepsius Leafhopper) - ST
- *Peoria gemmatella* (Gemmed Cordgrass Borer) - SR
- *Peoria tetradella* (none) - SR
- *Phaneta ochroterminana* (none) - SR
- *Phaneta olivaceana* (none) - SR
- *Phaneta umbrastriana* (none) - SR
- *Phaneta raracana* (none) - SR
- *Phaneta striatana* (none) - SR
- *Philaenarcys killa* (Great Lakes Dune Spittlebug) - SR
- *Phytometra ernestinana* (Ernestine's Moth) - SE
- *Platyperigea meralis* (Rare Sand Quaker) - ST
- *Poanes Massasoit* (Mulberry Wing Skipper) - SR
- *Polites mystic* (Long Dash Skipper) - SR
- *Polyamia caperata* (Little Bluestem Polyamia) - SR
- *Polyamia herbida* (Prairie Panic Grass Leafhopper) - ST

- *Problema byssus* (Bunchgrass Skipper) – ST
- *Prosapia ignipectus* (Red-legged Spittle Bug) - SR
- *Protorthodes incincta* (Saturn Quaker) – SR
- *Pyrausta laticlavata* (Southern Purple Mint Moth) - SR
- *Satyroides eurydice* (Eyed Brown) - SR
- *Semiothisa eremiata* (The Goat's Rue Looper) – SR
- *Scirpophaga perstialis* (none) – SR
- *Spartiniphaga inops* (Spartina Borer Moth) – SR
- *Spilosoma latipennis* (The Red-legged Tussock Moth) - SR
- *Speyeria Aphrodite* (Aphrodite Fritillary) - WL
- *Sphinx luscitiosa* (Luscious Willow Sphinx) – SR
- *Sympetrum semicinctum* (Band-winged Meadowhawk) - SR
- *Tarachidia binocular* (Prairie Tarachidia) - **
- *Thorybes pylades* (Northern Cloudywing) – SR
- *Tricholita notata* (Marked Noctuid) – ST
- *Trichosilia manifesta* (The Record Keeper Moth) –SR
- *Trimerotropis maritime* (The Dune Locust) - ST

Reptiles and Amphibians

- *Ambystoma laterale* (Blue-spotted Salamander) – SSC
- *Rana pipiens* (Northern Leopard Frog) – SSC
- *Acris crepitans* (Northern Cricket Frog) – SSC¹
- *Clemmys guttata* (Spotted Turtle) - SE
- *Emydoidea blandingii* (Blanding's Turtle) – SE
- *Sistrurus catenatus catenatus* (Eastern Massasauga) - SE, C
- *Thamnophis proximus proximus* (Western Ribbon Snake) - SSC
- *Ophisaurus attenuatus attenuatus* (Western Slender Glass Lizard) - NS

Birds

- *Ardea alba* (Great Egret) – SSC
- *Bartramia longicauda* (Upland Sandpiper) – SE
- *Botaurus lentiginosus* (American Bittern) – SE
- *Buteo lineatus* (Red-shouldered Hawk) - SSC
- *Certhia Americana* (Brown Creeper) – **
- *Chilidonias niger* (Black Tern) – SE
- *Cistothorus platensis* (Sedge Wren) – SE
- *Cistothorus palustris* (Marsh Wren) – SE
- *Haliaeetus leucocephalus* (Bald Eagle) – SSC
- *Ixobrychus exilis* (Least Bittern) – SE
- *Nycticorax nycticorax* (Black-crowned Night-heron) – SE
- *Rallus elegans* (King Rail) – SE
- *Rallus limicola* (Virginia Rail) – SE
- *Xanthocephalus xanthocephalus* (Yellow-headed Blackbird) – SE

Mammals

- *Spermophilus franklinii* (Franklin's Ground Squirrel) – SE

Plants

- *Agalinis skinneriana* (Pale False Foxglove) – ST
- *Alnus rugosa* (Speckled Alder) - SWL
- *Arctostaphylos uva-ursi* (Bearberry) – SR

- *Buchnera americana* (Bluehearts) - SE
- *Carex atherodes* (Lake sedge) – ST
- *Carex aurea* (Golden-fruited Sedge) – SR
- *Carex bebbii* (Bebb's Sedge) – ST
- *Carex brunnescens* (Brownish Sedge) – SE
- *Carex crawei* (Crawe Sedge) – ST
- *Carex garberi* (Elk Sedge) – ST
- *Carex limos* (Mud Sedge) – SE
- *Carex richardsonii* (Richardson Sedge) – ST
- *Cirsium hillii* (Hill's Thistle) - SE
- *Cypripedium calceolus* var. *parviflorum* (Small Yellow Lady's-slipper) - SR
- *Diervilla lonicera* (Northern Bush Honeysuckle) – SR
- *Eleocharis geniculata* (Capitate Spike-rush) – ST
- *Eriophorum angustifolium* (Narrow-leaved Cotton-grass) – SR
- *Gentiana alba* (Yellow Gentian) - SR
- *Juncus balticus* var. *littoralis* (Baltic Rush) – SR
- *Lechea stricta* (Upright Pinweed) – SX
- *Melampyrum lineare* (American Cow-wheat) – SR
- *Orobanche fasciculata* (Clustered Broomrape) - SE
- *Platanthera hookeri* (Hooker Orchis) – SX
- *Platanthera hyperborea* (Leafy Northern Green Orchis) – ST
- *Platanthera psycodes* (Small Purple-fringe Orchis) – SR
- *Polygonella articulata* (Eastern Jointweed) – SR
- *Potamogeton pulcher* (Spotted Pondweed) – SE MU
- *Prunus pensylvanica* (Fire Cherry) – SR
- *Rhus aromatica* var. *arenaria* (Beach Sumac) – SR
- *Satureja glabella* var. *angustifolia* (Calamint) - SE
- *Selaginella apoda* (Meadow Spike-moss) – SWL
- *Solidago ptarmicoides* (Prairie Goldenrod) – SR
- *Solidago simplex* var. *gillmanii* (Sticky Goldenrod) – ST
- *Spiranthes lucida* (Shining Ladies'-tresses) – SR
- *Spiranthes magnicamporum* (Great Plains Ladies'-tresses) - SE
- *Talinum rugospermum* (Prairie Fame-flower) – ST
- *Tofieldia glutinosa* (False Asphodel) – SR

¹ Alan & Donna Resetar. 2007. IBI Metric Development and Validation for the Amphibians of the Grand Calumet River Area of Concern (GCR AOC). Report submitted to Indiana Department of Environmental Management.

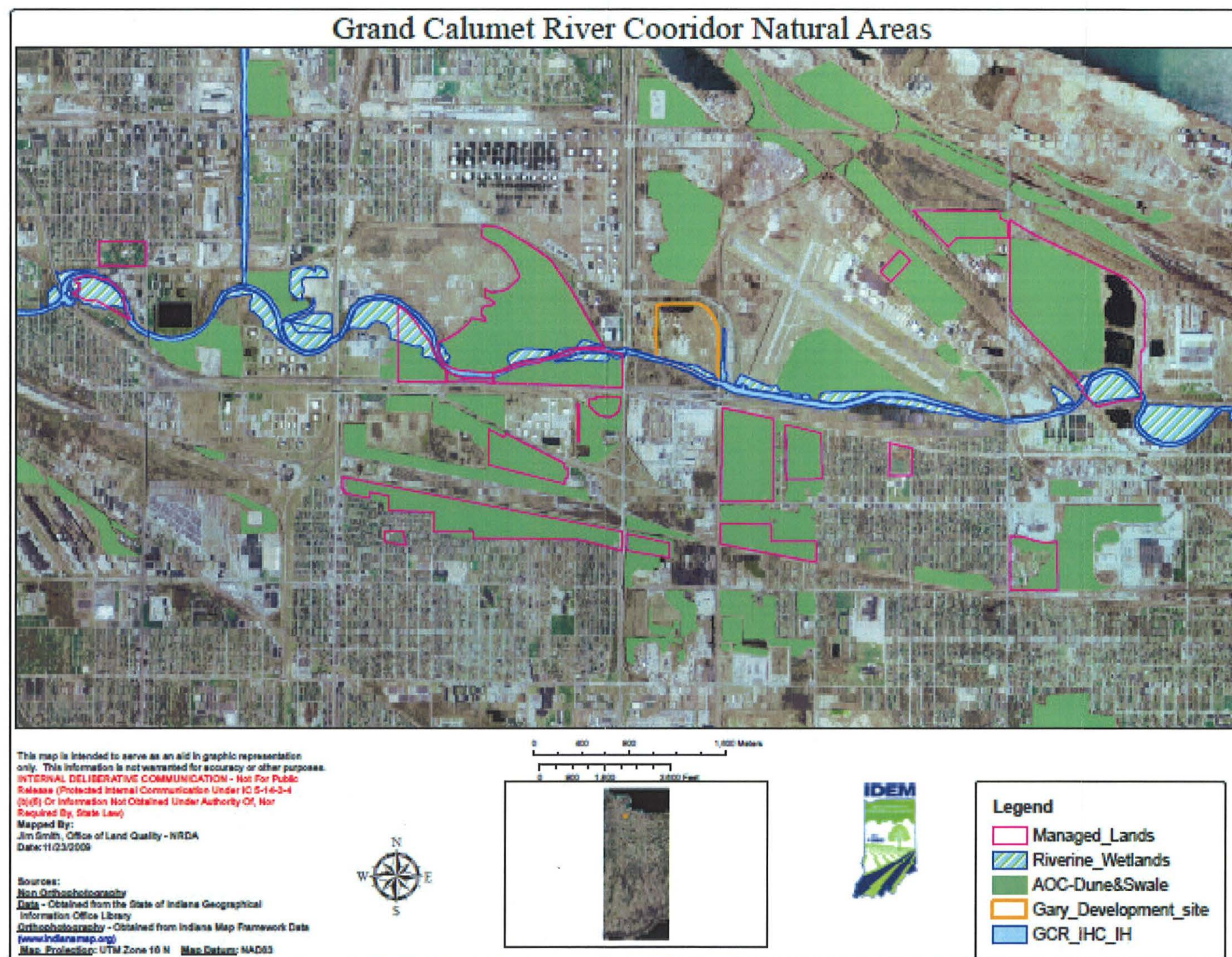


Figure 1. Natural features along the Grand Calumet River which provide a unique habitat corridor from Gary to Hammond, Indiana.

Natural Areas

In addition to the rare, threatened or endangered species listed above, several Nature Preserves and/or Natural Areas are located within or bordering the study area (Figure 1). Plant communities identified as "Special Groups" in the Heritage Database occur concurrent with some of the natural sites. These sites are described below.

Roxanna Pond (Marsh) Site – Located at the western edge of Grand Calumet River corridor depicted in Figure 1 and comprising a wetland shelf, Roxanna Marsh was a premier birding site prior the decline in Lake Michigan water level in the late 1990's. Exposure of mud flats and shallow open-water areas has resulted in near complete invasion of the marsh with common reed, cattails and purple loosestrife. Past records of occurrences of Least Bittern, Black-crowned Night-heron, Virginia Rail, Black Tern, Marsh Wren, and Yellow-headed Cowbirds are not likely to occur now because of sediment contamination and physical habitat change. In addition, occurrences of Northern Leopard Frog and Franklin's Ground Squirrel are not likely today because of the habitat changes.

Seidner Dune and Swale Nature Preserve and GCR Tern Site – Located on south side of river just west of the Gary Development Landfill site and includes a wetland shelf in the northern portion of the site. The Nature Preserve contains remnant dune and swale habitat and records of Franklin's Ground Squirrel, Great Egret, Black Tern, Marsh Wren, Leonard's Skipper, Sand Barrens Grammia, Gemmed Cordgrass Borer, Goat's Rue Looper, Oithona's Grammia, Two-lined Cosmotettix, and Baltic's Rush (Hellmich, 2009). Blue lupine (*Lupinus perennis* L.) is common in the area south of the wetland shelf, thus the federally endangered Karner Blue Butterfly is likely to occur on this site. The wetland shelf is dominated by common reed and cattails.

DuPont Dune and Swale Site – This natural area is located on the north side of the river, just north of Seidner Dune and Swale Nature Preserve and east of the USS Lead site. A wetland shelf is included within this area immediately adjacent to the river. The Natural Resource Trustees are working with DuPont to place a conservation easement on this natural area (as part of the NRDA Settlement). Records of King Rail, Franklin's Ground Squirrel, Blanding's Turtle, Northern Bush-honeysuckle, Prairie Goldenrod, Golden-fruited Sedge, Bebb's Sedge, Narrow-leaved Cotton-grass, Baltic Rush, and Meadow Spike-rush exist for this site. Additionally, Dry-mesic Sand Prairie, Wet-mesic Sand Prairie, and Dry Sand Prairie plant communities have been found on the site. Restoration completed by The Nature Conservancy has established Blue Lupine and Karner Blue Butterflies are now utilizing the site (Paul Labus, Personal Communication). Recent surveys of plant and insect communities on this site has resulted in; (1) 9 plant species of which 5 are Rare, 2 Endangered, 1 Threatened and 1 on State Watch List and (2) 69 species of insects of which 41 are State Rare, 5 State Endangered, 19 State Threatened and 4 on State Watch List (Hellmich, 2009).

Cline Avenue Nature Preserve and Cline Avenue Dune and Swale Site - This site is located approximately 1/2 mile south of Grand Calumet River and is south of the I90 Toll Road. The site contains Northern Bush-honeysuckle and has Dry-mesic Sand Prairie, Dry-mesic Sand Savanna, and Shrub Swamp Wetland plant communities. Surveys of insects between 2000 and 2007 have identified 32 State Rare, 2 State Endangered and 5 State Threatened species on this site (Hellmich, 2009).

Ivanhoe Dune and Swale, Ivanhoe Dune and Swale Nature Preserve - This site is located within a 1/2-mile buffer zone of the Grand Calumet River, just southeast of the project site and south of the I90 Toll Road. The site is a dedicated Nature Preserve and has records of Blue-spotted Salamander, Blanding's Turtle, Virginia Rail, Brown Creeper, Slender Glass Lizard, Bunchgrass Skipper, Dusted

Skipper, Karner Blue, Beach Sumac, Northern Bush-honeysuckle, Fire Cherry, Baltic Rush, and Leafy Northern Green Orchid. Additionally, plant communities associated with Pond, Dry-mesic Sand Prairie, Mesic Sand Prairie, Wet Sand Prairie, Dry-mesic Sand Savanna, Mesic Sand Savanna, Marsh, and Shrub Swamp exist at the site.

Pine Station Nature Preserve - This site is located approximately 1 .25 mile east of the Gary Development Landfill site. The site has records of Blanding's Turtle, Least Bittern, Virginia Rail, Marsh Wren, Franklin's Ground Squirrel, Spotted Turtle (more than 1/2 mile away, Slender Glass Lizard, Eastern Massasauga, Dusted Skipper, a Noctuid moth, Hill's Thistle, Prairie Goldenrod, Bearberry, Pale False Foxglove, American Cow-wheat, Golden-fruited Sedge, Brownish Sedge, Crawe Sedge, Elk Sedge, Richardson Sedge, Capitata Spike-rush, False Asphodel, Small Yellow Lady's-slipper (more than 1/2 mile from river), Spotted Pondweed (more than 1/2 mile from river), and other State Endangered, Rare or Threatened Species (see Hellmich, 2009 for most recent listings).

Other wetland shelves, remnant Dune and Swale habitat, and unique communities are depicted on Figure 1 below.

References

- Alan & Donna Resetar. 2007. IBI Metric Development and Validation for the Amphibians of the Grand Calumet River Area of Concern (GCR AOC). Report submitted to Indiana Department of Environmental Management.
- U.S. EPA 1992. Hazard Ranking System Guidance Manual. Office Solid Waste and Emergency Response. EPA 540-R-92-026. November, 1992.

Appendix A

Bibliographical Information

James (Jim) R. Smith, Ph.D.
Office of Legal Counsel (NRDA Program)
Indiana Department of Environmental Management
100 N. Senate Avenue – N-1307
Indianapolis, IN 46204-2251
(317) 232-3451
jsmith@idem.in.gov

Educational Background:

B.S. - Eastern Kentucky University, 1970 - Biological Sciences/Wildlife Management
M.S. - Eastern Kentucky University, 1975 - Biological Sciences/Wildlife Biology
Ph.D. - Southern Illinois University-Carbondale, 1986 - Zoology/Wildlife and Plant Ecology

Current Position: Senior Environmental Manager (Natural Resource Damage Coordinator)
Office of and Quality, Natural Resource Damage Program
Indiana Department of Environmental Management

Dr. Smith has worked for the Indiana Department of Environmental Management (IDEM) since 1990. Started in Office of Water Enforcement and after a year moved to Office of Environmental Response Superfund Program. Jim currently coordinates the Natural Resource Damage Program in IDEM which seeks to obtain damages (\$) for injuries to Indiana's natural resources from the release of hazardous substance and/or spills of oil. Injury assessment involves characterization of chemical, biological and physical impacts to areas, media, and biota. Successful settlements and/or claims are utilized to restore, rehabilitate or acquire the equivalent of the injured natural resources. Restoration efforts include acquisition and protection of habitat through outright purchase, conservation easement or partnering with private or public land holding interests; and restoration of riparian and/or upland habitats through creation, enhancement or rehabilitation (eliminating ecological stresses). Jim has worked on or around the Grand Calumet River Area of Concern since 1992. He has conducted sediment, water, fish community, wetland plant community, fish tissue, sediment toxicity and invertebrate community analyses. Jim is currently working on a Feasibility Study with US Army Corps of Engineers and two Great Lakes Legacy Act projects with US EPA on the Grand Calumet River. Jim has received numerous recognitions for his work including being awarded Commission of "Colonel" on the Staff of the Governor of Kentucky in the "Honorable Order of Kentucky Colonels", twice awarded Indiana Department of Environmental Management's Environmental Excellence Award (the agency's highest award) for work in the NRD program and Remedial Action Plan Development for the Grand Calumet River, Indiana Harbor and Ship Canal Area of Concern and several Environmental Impact Awards for NRD activities. Jim has held positions of President-Elect, President, Past President and Board Member of Ohio Valley Regional Chapter of SETAC, member of Indiana Chapter American Fisheries Society, member of States Ad-

Hoc NRD Work Group, member Great Lakes NRD Roundtable Steering Committee and member of Sediment Advisory Group.

Experience:

Technical Advisor and Natural Resource Damage Coordinator, IDEM-OER- 1994 - present

Ecological Risk/ NRDA/ ARARs/Project Management - Superfund, IDEM-OER - 1992 - 1994

Remedial Project Manager, Superfund, IDEM-OER, 1991 - 1992

Enforcement, IDEM, Water Management - 1990 - 1991

University Administration/ Undergraduate Registration, Southern Illinois University-Carbondale, 1983 - 1989

College Teacher - Illinois College, 1983

Wildlife Researcher (Mined Land Research), Cooperative Wildlife Research Laboratory, Southern Illinois University-Carbondale, 1979-1982

Chemist, Kentucky Department of Agriculture, State –Federal Meat Inspection Laboratory, Frankfort, KY, 1975

Recent Publications

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Provided IDEM Oversight/Field Support on Projects

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State Form 4336

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: March 26, 2010

TO: Jaworski, Mark, OLQ SI THRU: Admire, Beth, OLC
Hauer, Gabriele, OLQ SI

FROM: Smith, Jim R., OLC, NRD Program

SUBJECT: Gary Development Landfill Site, Gary, Lake County, Indiana
Modification of November 24, 2009 Memorandum

The Indiana Department Environmental Management (IDEM) Natural Resource Damages (NRD) Program was asked to respond to questions and provide updates to the rare, threatened or endangered species memorandum produced on November 24, 2009 for the Gary Development Landfill site. Specific comment to be addressed was:

Smith 11/24/09 Memo - Figure 1:

Please double check that the natural areas evaluated for this memo were areas that are contiguous to the Grand Calumet River from the PPE of Gary Development to when it meets Lake Michigan.

A color map is preferred.

Figure needs to be larger so text in lower left hand corner can be read.

"INTERNAL DELIBERATIVE INFORMATION" - Region would prefer a releasable map of the areas, if possible.

Response: After discussion with U.S. EPA staff the following were determined: Staff of Indiana Department of Environmental Management NRD Program wrote the November 24, 2009 memo to illustrate relevance of Gary Development Landfill site to the unique habitats formed as part of the Grand Calumet River Natural Habitat Corridor. Natural areas between Bridge Street in Gary (east edge of area illustrated in attached Figure 1) to Roxana Marsh (west edge of area illustrated in attached Figure 1) form an extremely unique habitat corridor connecting globally rare dune and swale and riverine habitats throughout. Gary Development Landfill is directly in the center of this corridor and as such forms an important link in this corridor. Remediation of the site and restoration of wetlands and aquatic habitat will facilitate protection and connectivity of the numerous rare, threatened and endangered species within this corridor.

The map illustrated in Figure 1 has been updated to include a buffer along the Grand Calumet

River, which buffer is area discussed within text relative to Rare, Threatened and Endangered species occurrence and primary Natural Areas. The Figure has been replaced in the attached memo and is submitted as a separate PDF file to facilitate transmittal to U.S. EPA as a color illustration.

Attachments (2)

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: November 24, 2009

TO: Jaworski, Mark, OLQ SI

THRU: Admire, Beth, OLC
Hauer, Gabriele, OLQ SI

FROM: Smith, Jim R., OLQ, NRDA

SUBJECT: Gary Development Landfill Site HRS – Particular Areas, Relatively Small in Size,
Important to Maintenance of Unique Biotic Communities,

and Bibliographic Information on Dr. Jim Smith (attached as Appendix A)

Particular Areas, Relatively Small in Size, Important to Maintenance of Unique Biotic Communities are: "Areas that are important for the maintenance of unique, rare, or otherwise ecologically valuable biotic communities. . . . [including] . . . Areas with a high proportion of species with highly restrictive habitat requirements due to unusual natural biotic and/or abiotic conditions; highly isolated area that may not have an unusual community structure *per se*, but because of its geographic isolation is particularly important to the continued existence of that community; areas with a high proportion of species that are locally endemic because of a relatively long period of geographical isolation and/or exceptional examples of "climax" communities because of minimal human disturbance; or areas vital for a species that are important to the maintenance of a community" (US EPA 1992).

The Gary Development Landfill site provides several of these functions to the Grand Calumet River Corridor providing a continuity to riverine wetlands, natural areas (some protected by State ownership, dedicated Natural Areas, sensitive biotic communities and globally rare Dune and Swale habitat) (see Figure 1 below) for details of Grand Calumet River Corridor communities). Clean up and restoration of riverine wetlands and protection of the corridor adjacent to south of the Gary Development Landfill site will provide and enhance a link between rare and fragmented habitats along the river corridor. The following text, Table 1, and Figure 1 provide details of community and habitat components that provide evidence of unique function of corridor connectivity that the Gary Development Landfill site serves, meeting many of the definition requirements listed above for this Sensitive Environment type.

Threatened & Endangered Species

The Indiana Department of Natural Resources Heritage Database contains a list of several hundred potentially endangered, threatened, rare, of special concern, extirpated, and watch list species that

occur in Lake County, Indiana. Of those species in Lake County, a small subdivision occurs or potentially could occur within the Grand Calumet River-Indiana Harbor Canal Area of Concern (GCR-IHC). Table 1 provides a summary of county/GCR-IHC Rare and Endangered species in the database.

Table 1. Summary of Endangered, Threatened and Rare species in Grand Calumet River – Indiana Harbor Canal Area of Concern, Lake County Indiana.

Group	LE	LT	C	PDL	SE	ST	SR	SSC	SX	SG	WL
Plant		2			31	23	38		6		4
Plant Community											13
Mollusk											
Insect ¹	3				5	8	7		2		1
Fish					1						
Amphibian								3			
Reptile			1		4			4			
Bird	1	1		3*	13			3	1		
Migratory Bird Area											
Mammal					1						

Federal Listings: LE – Endangered; LT- Threatened; C – Candidate; PDL – Proposed for delisting

State Listings: SE – Endangered; ST – Threatened; SR – Rare; SSC – Special Concern; SX – Extirpated; WL – Watch List; SG – Special Group

* Birds have been delisted by USFWS and have no current ESA status

¹ Insect surveys in 2005 and 2008 has significantly increased the number of State Rare, State Threatened and State Endangered Insects in the AOC. The added species are included in the listing below this Table.

Of those rare, threatened or endangered species that occur in the GCR-IHC AOC (Hellmich, 2009), the following have been recorded within ½ mile of Grand Calumet River Corridor between Gary and Hammond (see Figure 1 for area of consideration):

Insects

- *Acronicta dactylina* (none) - SR
- *Aethes patricia* (none) – SE
- *Agrotis stigmata* (none) - ST
- *Agrotis vetusta* (A Moth) - SR
- *Ancylis semiovana* (none) – SR
- *Anepia capsularis* (The Starry Campion Capsule Moth) - SR
- *Apamea nigrif* (Black-dashed Apamea) - SR
- *Atrytonopsis hianna* (Dusty Skipper) – ST
- *Bruchomorpha dorsata* (none) – SR
- *Bruchomorpha extensa* (Long-nosed Elephant Hopper) – SR
- *Capis curvata* (A Noctuid Moth) - ST
- *Chloealtis conspersa* (Sprinkled Locust) – SR
- *Chlorotettix fallax* (A Leafhopper) - SR
- *Conocephalus saltans* (Prairie Meadow Katydid) – SR
- *Coenochroa illibella* (Dune Panic Grass Moth) - SR
- *Cosmotettix bilineatus* (Two-lined Cosmotettix) - ST
- *Croesia semipurpurana* (Oak Lieftier) – SR
- *Cynia inopinatus* (The Unexpected Milkweed Moth) – SR
- *Erynnis persius persius* (Persius Dusky Wing) – SR
- *Eucrotopcnemis fimbriaris* (A Noctuid Moth) - ST

- *Eucosma bilineana* (none) - SR
- *Eucosma fulminana* (none) - SR
- *Eucosma giganteana* (none) - SR
- *Euphyes dion* (Sedge Skipper) - SR
- *Fagitana littera* (The Marsh Fern Moth) - ST
- *Faronta rubripennis* (The Pine Streak) - ST
- *Flexamia reflexus* (Indiangrass Flexamia) - ST
- *Grammia figurate* (The Figured Grammia) - SR
- *Grammia mohri* (none) - SR
- *Grammia oithona* (Oithona's Grammia) - SR
- *Grammia phyllira* (Sand Barrens Grammia) - SR
- *Grammia virguncula* (none) - SR
- *Hesperia leonardus* (Leonard's Skipper) - SR
- *Hesperptettix viridis pratensis* (A Grasshopper) - SR
- *Hypernodes caducus* (Large Hypernodes) - SR
- *Hyperaeschra georgica* (Georgian Prominent Moth) - **
- *Laevicephalus acus* (none) - SR
- *Lemmeria digitalis* (A Noctuid Moth) - SR
- *Leucania inermis* (A Moth) - SR
- *Leucania linita* (Salt Marsh Wainscot) - SR
- *Lodopepla u-album* (A Noctuid Moth) - SR
- *Lycaeides melissa samuelis* (Karner Blue Butterfly) - SE, LE
- *Lycaena helloides* (Purplish Copper) - SR
- *Macrochilo absorptalis* (A Moth) - SR
- *Macrpchilo hypocritalis* (A Noctuid Moth) - SR
- *Macrochilo louisiana* (none) - ST
- *Meropleon ambifuscum* (Newman's Brocade) - ST
- *Mesamia nigradorsum* (A Leafhopper) - SR
- *Metanema determinate* (Dark Metanema) - SR
- *Neoconocephalus nebrascensis* (A Katydid) - SR
- *Nola cilicoides* (none) - SR
- *Notodonta scitipennis* (A Notodontid Moth) - **
- *Oligia obtuse* (A Noctuid Moth) - SE
- *Oncocnemis riparia* (The Dune Oncocnemis Moth) - ST
- *Papaipema berriana* (Beer's Blazing Star Borer Moth) - ST
- *Papaipema leucostigma* (Columbine Borer) - ST
- *Papaipema lysimachiae* (St. John'swort Borer Moth) - SR
- *Papaipema maritime* (Giant Sunflower Borer Moth) - ST
- *Papaipema rigida* (A Borer Moth) - SR
- *Paraphlepsius lobatus* (none) - ST
- *Paraphlepsius maculosus* (Peppered Paraphlepsius Leafhopper) - ST
- *Peoria gemmatella* (Gemmed Cordgrass Borer) - SR
- *Peoria tetradella* (none) - SR
- *Phaneta ochroterminana* (none) - SR
- *Phaneta olivaceana* (none) - SR
- *Phaneta umbrastriana* (none) - SR
- *Phareta raracana* (none) - SR
- *Phaneta striatana* (none) - SR
- *Philaenarcys killa* (Great Lakes Dune Spittlebug) - SR
- *Phytometra ernestinana* (Ernestine's Moth) - SE
- *Platyperigea meralis* (Rare Sand Quaker) - ST
- *Poanes Massasoit* (Mulberry Wing Skipper) - SR
- *Polites mystic* (Long Dash Skipper) - SR
- *Polyamia caperata* (Little Bluestem Polyamia) - SR
- *Polyamia herbida* (Prairie Panic Grass Leafhopper) - ST

- *Problema byssus* (Bunchgrass Skipper) – ST
- *Prosapia ignipectus* (Red-legged Spittle Bug) - SR
- *Protorthodes incincta* (Saturn Quaker) – SR
- *Pyrausta laticlavata* (Southern Purple Mint Moth) - SR
- *Satyroides eurydice* (Eyed Brown) - SR
- *Semiothisa eremiata* (The Goat's Rue Looper) – SR
- *Scirpophaga perstialis* (none) – SR
- *Spartiniphaga inops* (Spartina Borer Moth) – SR
- *Spilosoma latipennis* (The Red-legged Tussock Moth) - SR
- *Speyeria Aphrodite* (Aphrodite Fritillary) - WL
- *Sphinx luscitiosa* (Luscious Willow Sphinx) – SR
- *Sympetrum semicinctum* (Band-winged Meadowhawk) - SR
- *Tarachidia binocular* (Prairie Tarachidia) - **
- *Thorybes pylades* (Northern Cloudywing) – SR
- *Tricholita notata* (Marked Noctuid) – ST
- *Trichosilia manifesta* (The Record Keeper Moth) –SR
- *Trimerotropis maritima* (The Dune Locust) - ST

Reptiles and Amphibians

- *Ambystoma laterale* (Blue-spotted Salamander) – SSC
- *Rana pipiens* (Northern Leopard Frog) – SSC
- *Acris crepitans* (Northern Cricket Frog) – SSC¹
- *Clemmys guttata* (Spotted Turtle) - SE
- *Emydoidea blandingii* (Blanding's Turtle) – SE
- *Sistrurus catenatus catenatus* (Eastern Massasauga) - SE, C
- *Thamnophis proximus proximus* (Western Ribbon Snake) - SSC
- *Ophisaurus attenuatus attenuatus* (Western Slender Glass Lizard) - NS

Birds

- *Ardea alba* (Great Egret) – SSC
- *Bartramia longicauda* (Upland Sandpiper) – SE
- *Botaurus lentiginosus* (American Bittern) – SE
- *Buteo lineatus* (Red-shouldered Hawk) - SSC
- *Certhia Americana* (Brown Creeper) – **
- *Chlidonias niger* (Black Tern) – SE
- *Cistothorus platensis* (Sedge Wren) – SE
- *Cistothorus palustris* (Marsh Wren) – SE
- *Haliaeetus leucocephalus* (Bald Eagle) – SSC
- *Ixobrychus exilis* (Least Bittern) – SE
- *Nycticorax nycticorax* (Black-crowned Night-heron) – SE
- *Rallus elegans* (King Rail) – SE
- *Rallus limicola* (Virginia Rail) – SE
- *Xanthocephalus xanthocephalus* (Yellow-headed Blackbird) – SE

Mammals

- *Spermophilus franklinii* (Franklin's Ground Squirrel) – SE

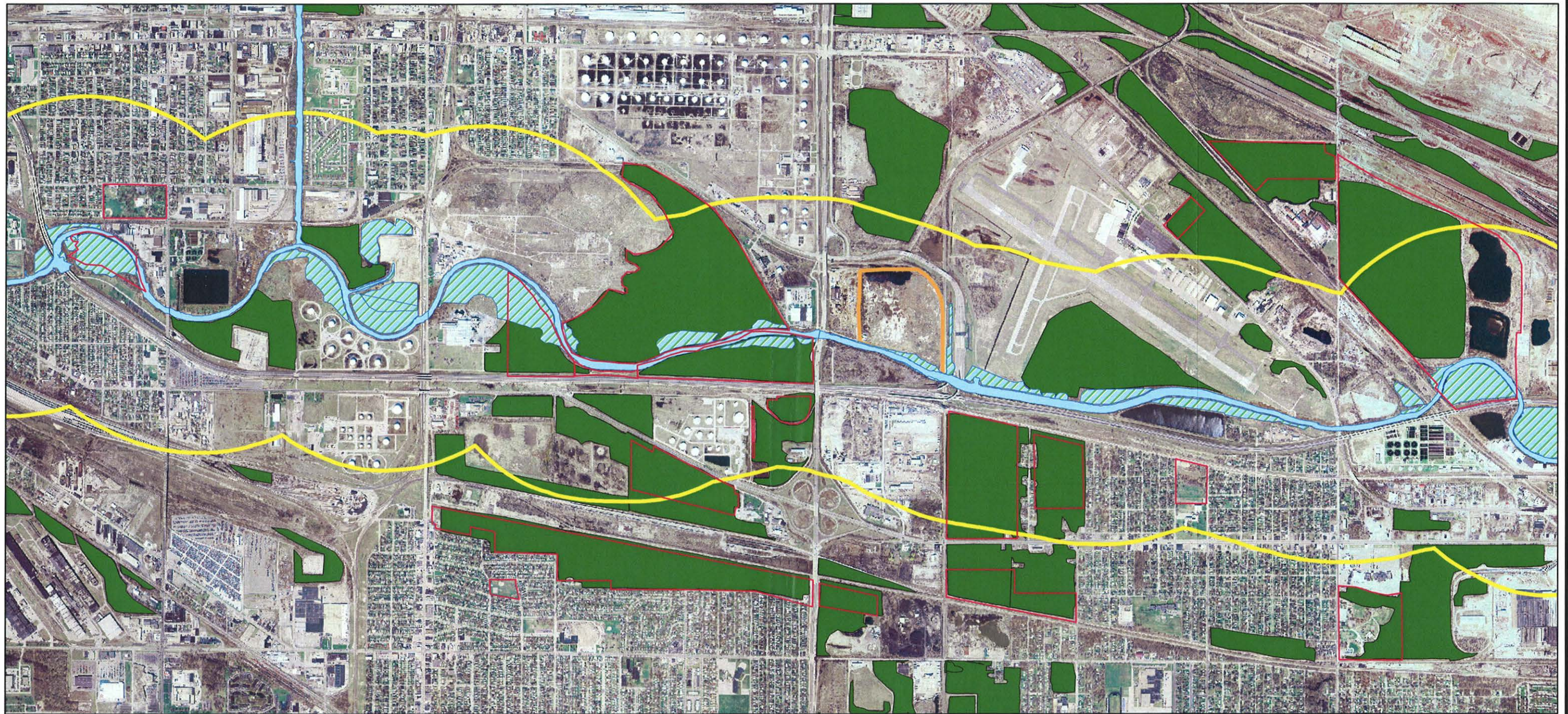
Plants

- *Agalinis skinneriana* (Pale False Foxglove) – ST
- *Alnus rugosa* (Speckled Alder) - SWL
- *Arctostaphylos uva-ursi* (Bearberry) – SR

- *Buchnera americana* (Bluehearts) - SE
- *Carex atherodes* (Lake sedge) – ST
- *Carex aurea* (Golden-fruited Sedge) – SR
- *Carex bebbii* (Bebb's Sedge) – ST
- *Carex brunnescens* (Brownish Sedge) – SE
- *Carex crawei* (Crawe Sedge) – ST
- *Carex garberi* (Elk Sedge) – ST
- *Carex limos* (Mud Sedge) – SE
- *Carex richardsonii* (Richardson Sedge) – ST
- *Cirsium hillii* (Hill's Thistle) - SE
- *Cypripedium calceolus* var. *parviflorum* (Small Yellow Lady's-slipper) - SR
- *Diervilla lonicera* (Northern Bush Honeysuckle) – SR
- *Eleocharis geniculata* (Capitate Spike-rush) – ST
- *Eriophorum angustifolium* (Narrow-leaved Cotton-grass) – SR
- *Gentiana alba* (Yellow Gentian) - SR
- *Juncus balticus* var. *littoralis* (Baltic Rush) – SR
- *Lechea stricta* (Upright Pinweed) – SX
- *Melampyrum lineare* (American Cow-wheat) – SR
- *Orobancha fasciculata* (Clustered Broomrape) - SE
- *Platanthera hookeri* (Hooker Orchis) – SX
- *Platanthera hyperborea* (Leafy Northern Green Orchis) – ST
- *Platanthera psycodes* (Small Purple-fringe Orchis) – SR
- *Polygonella articulata* (Eastern Jointweed) – SR
- *Potamogeton pulcher* (Spotted Pondweed) – SE MU
- *Prunus pensylvanica* (Fire Cherry) – SR
- *Rhus aromatica* var. *arenaria* (Beach Sumac) – SR
- *Satureja glabella* var. *angustifolia* (Calamint) - SE
- *Selaginella apoda* (Meadow Spike-moss) – SWL
- *Solidago ptarmicoides* (Prairie Goldenrod) – SR
- *Solidago simplex* var. *gillmanii* (Sticky Goldenrod) – ST
- *Spiranthes lucida* (Shining Ladies'-tresses) – SR
- *Spiranthes magnicamporum* (Great Plains Ladies'-tresses) - SE
- *Talinum rugospermum* (Prairie Fame-flower) – ST
- *Tofieldia glutinosa* (False Asphodel) – SR

¹ Alan & Donna Resetar. 2007. IBI Metric Development and Validation for the Amphibians of the Grand Calumet River Area of Concern (GCR AOC). Report submitted to Indiana Department of Environmental Management.

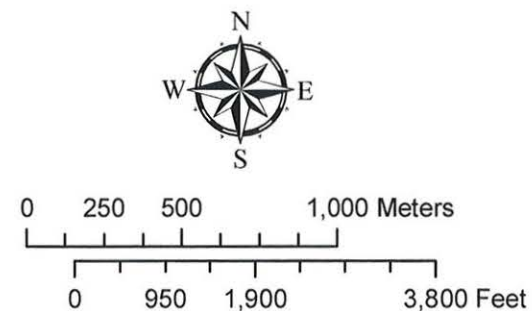
Figure 1. Natural Features along Grand Calumet River Provide Unique Habitat Corridor.



This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Mapped By:
Dr. Jim Smith, Office of Land Quality - NRD Program
Date: 03/25/2010

Sources:
Non Orthophotography
Data - Obtained from the State of Indiana Geographical Information Office Library
Orthophotography - Obtained from Indiana Map Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N **Map Datum:** NAD83



Legend

	Managed_Lands
	GCR_IHC_IH
	AOC_boundaries
	GCR_Buffer
	Gary_Development_site
	Riverine_Wetlands
	AOC-Dune&Swale

Natural Areas

In addition to the rare, threatened or endangered species listed above, several Nature Preserves and/or Natural Areas are located within or bordering the study area (Figure 1). Plant communities identified as "Special Groups" in the Heritage Database occur concurrent with some of the natural sites. These sites are described below.

Roxanna Pond (Marsh) Site – Located at the western edge of Grand Calumet River corridor depicted in Figure 1 and comprising a wetland shelf, Roxanna Marsh was a premier birding site prior the decline in Lake Michigan water level in the late 1990's. Exposure of mud flats and shallow open-water areas has resulted in near complete invasion of the marsh with common reed, cattails and purple loosestrife. Past records of occurrences of Least Bittern, Black-crowned Night-heron, Virginia Rail, Black Tern, Marsh Wren, and Yellow-headed Cowbirds are not likely to occur now because of sediment contamination and physical habitat change. In addition, occurrences of Northern Leopard Frog and Franklin's Ground Squirrel are not likely today because of the habitat changes.

Seidner Dune and Swale Nature Preserve and GCR Tern Site – Located on south side of river just west of the Gary Development Landfill site and includes a wetland shelf in the northern portion of the site. The Nature Preserve contains remnant dune and swale habitat and records of Franklin's Ground Squirrel, Great Egret, Black Tern, Marsh Wren, Leonard's Skipper, Sand Barrens Grammia, Gemmed Cordgrass Borer, Goat's Rue Looper, Oithona's Grammia, Two-lined Cosmotettix, and Baltic's Rush (Hellmich, 2009). Blue lupine (*Lupinus perennis* L.) is common in the area south of the wetland shelf, thus the federally endangered Karner Blue Butterfly is likely to occur on this site. The wetland shelf is dominated by common reed and cattails.

DuPont Dune and Swale Site – This natural area is located on the north side of the river, just north of Seidner Dune and Swale Nature Preserve and east of the USS Lead site. A wetland shelf is included within this area immediately adjacent to the river. The Natural Resource Trustees are working with DuPont to place a conservation easement on this natural area (as part of the NRDA Settlement). Records of King Rail, Franklin's Ground Squirrel, Blanding's Turtle, Northern Bush-honeysuckle, Prairie Goldenrod, Golden-fruited Sedge, Bebb's Sedge, Narrow-leaved Cotton-grass, Baltic Rush, and Meadow Spike-rush exist for this site. Additionally, Dry-mesic Sand Prairie, Wet-mesic Sand Prairie, and Dry Sand Prairie plant communities have been found on the site. Restoration completed by The Nature Conservancy has established Blue Lupine and Karner Blue Butterflies are now utilizing the site (Paul Labus, Personal Communication). Recent surveys of plant and insect communities on this site has resulted in; (1) 9 plant species of which 5 are Rare, 2 Endangered, 1 Threatened and 1 on State Watch List and (2) 69 species of insects of which 41 are State Rare, 5 State Endangered, 19 State Threatened and 4 on State Watch List (Hellmich, 2009).

Cline Avenue Nature Preserve and Cline Avenue Dune and Swale Site - This site is located approximately ½ mile south of Grand Calumet River and is south of the I90 Toll Road. The site contains Northern Bush-honeysuckle and has Dry-mesic Sand Prairie, Dry-mesic Sand Savanna, and Shrub Swamp Wetland plant communities. Surveys of insects between 2000 and 2007 have identified 32 State Rare, 2 State Endangered and 5 State Threatened species on this site (Hellmich, 2009).

Ivanhoe Dune and Swale, Ivanhoe Dune and Swale Nature Preserve - This site is located within a ½-mile buffer zone of the Grand Calumet River, just southeast of the project site and south of the I90 Toll Road. The site is a dedicated Nature Preserve and has records of Blue-spotted Salamander, Blanding's Turtle, Virginia Rail, Brown Creeper, Slender Glass Lizard, Bunchgrass Skipper, Dusted

Skipper, Karner Blue, Beach Sumac, Northern Bush-honeysuckle, Fire Cherry, Baltic Rush, and Leafy Northern Green Orchid. Additionally, plant communities associated with Pond, Dry-mesic Sand Prairie, Mesic Sand Prairie, Wet Sand Prairie, Dry-mesic Sand Savanna, Mesic Sand Savanna, Marsh, and Shrub Swamp exist at the site.

Pine Station Nature Preserve - This site is located approximately 1 .25 mile east of the Gary Development Landfill site. The site has records of Blanding's Turtle, Least Bittern, Virginia Rail, Marsh Wren, Franklin's Ground Squirrel, Spotted Turtle (more than ½ mile away, Slender Glass Lizard, Eastern Massasauga, Dusted Skipper, a Noctuid moth, Hill's Thistle, Prairie Goldenrod, Bearberry, Pale False Foxglove, American Cow-wheat, Golden-fruited Sedge, Brownish Sedge, Crawe Sedge, Elk Sedge, Richardson Sedge, Capitata Spike-rush, False Asphodel, Small Yellow Lady's-slipper (more than ½ mile from river), Spotted Pondweed (more than ½ mile from river), and other State Endangered, Rare or Threatened Species (see Hellmich, 2009 for most recent listings).

Other wetland shelves, remnant Dune and Swale habitat, and unique communities are depicted on Figure 1 below.

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Appendix A

Bibliographical Information

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Indiana Department of Environmental Management
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Educational Background:

B.S. - Eastern Kentucky University, 1970 - Biological Sciences/Wildlife Management
M.S. - Eastern Kentucky University, 1975 - Biological Sciences/Wildlife Biology
Ph.D. - Southern Illinois University-Carbondale, 1986 - Zoology/Wildlife and Plant Ecology

Current Position: Senior Environmental Manager (Natural Resource Damage Coordinator)
Office of and Quality, Natural Resource Damage Program
Indiana Department of Environmental Management

Dr. Smith has worked for the Indiana Department of Environmental Management (IDEM) since 1990. Started in Office of Water Enforcement and after a year moved to Office of Environmental Response Superfund Program. Jim currently coordinates the Natural Resource Damage Program in IDEM which seeks to obtain damages (\$) for injuries to Indiana's natural resources from the release of hazardous substance and/or spills of oil. Injury assessment involves characterization of chemical, biological and physical impacts to areas, media, and biota. Successful settlements and/or claims are utilized to restore, rehabilitate or acquire the equivalent of the injured natural resources. Restoration efforts include acquisition and protection of habitat through outright purchase, conservation easement or partnering with private or public land holding interests; and restoration of riparian and/or upland habitats through creation, enhancement or rehabilitation (eliminating ecological stresses). Jim has worked on or around the Grand Calumet River Area of Concern since 1992. He has conducted sediment, water, fish community, wetland plant community, fish tissue, sediment toxicity and invertebrate community analyses. Jim is currently working on a Feasibility Study with US Army Corps of Engineers and two Great Lakes Legacy Act projects with US EPA on the Grand Calumet River. Jim has received numerous recognitions for his work including being awarded Commission of "Colonel" on the Staff of the Governor of Kentucky in the "Honorable Order of Kentucky Colonels", twice awarded Indiana Department of Environmental Management's Environmental Excellence Award (the agency's highest award) for work in the NRD program and Remedial Action Plan Development for the Grand Calumet River, Indiana Harbor and Ship Canal Area of Concern and several Environmental Impact Awards for NRD activities. Jim has held positions of President-Elect, President, Past President and Board Member of Ohio Valley Regional Chapter of SETAC, member of Indiana Chapter American Fisheries Society, member of States Ad-

Hoc NRD Work Group, member Great Lakes NRD Roundtable Steering Committee and member of Sediment Advisory Group.

Experience:

Technical Advisor and Natural Resource Damage Coordinator, IDEM-OER- 1994 - present

Ecological Risk/ NRDA/ ARARs/Project Management - Superfund, IDEM-OER - 1992 - 1994

Remedial Project Manager, Superfund, IDEM-OER, 1991 - 1992

Enforcement, IDEM, Water Management - 1990 - 1991

University Administration/ Undergraduate Registration, Southern Illinois University-Carbondale, 1983 - 1989

College Teacher - Illinois College, 1983

Wildlife Researcher (Mined Land Research), Cooperative Wildlife Research Laboratory, Southern Illinois University-Carbondale, 1979-1982

Chemist, Kentucky Department of Agriculture, State -Federal Meat Inspection Laboratory, Frankfort, KY, 1975

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Appendix D
15 Mile Surface Water Pathway Map

C



15 Mile Surface Water Pathway, Gary Development Landfill, Gary, Lake County, IN



Legend

- █ Gary Development Landfill
- Point of Probable Entry (PPE)
- Surface Water Pathway
(pathway extends into Lake Michigan totaling miles)

0 0.25 0.5 1 1.5 2 Miles

0 0.25 0.5 1 1.5 2 Kilometers



Mapped on July 1, 2005
by Lorraine Wright
Applied Science Technologies
Science Services Branch
Office of Land Quality
Indiana Department of Environmental Management

Sources:
US Census - Tiger county boundaries;
Digital USGS Topographic Map;
Surface Water Pathway digitized
from USGS topographic map;
Gary Development Landfill boundary is an
approximation - locations digitized
from topographic maps, NRCS 2003
Orthophotography, and verbal descriptions
by Mark Jawarski

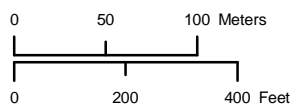
DISCLAIMER:
This map does not represent a legal document. It is intended
to serve as an aid in graphic representation only. Information
shown on this map is not warranted for accuracy.


APPENDIX 5
WETLAND LOCATION MAP


Wetland Location

Gary Development Landfill, Gary, Lake County, Indiana

(U.S. EPA ID: IND077005916)



 Wetland Classified PEMF

 Approximate Site Boundary

Semi-permanently flooded emergent (PEMF) wetland habitat.

PEMF classification:
SYSTEM = Palustrine
CLASS = EMergent
WATER REGIME, NON-TIDAL (Modifier) = Semi-permanently Flooded

Source: Classification of Wetlands and Deepwater Habitats of the United States, Cowardin ET AL. 1979 as modified for National Wetland Inventory Mapping Convention

Sources:

Non Orthophotography Data

- Obtained from the State of Indiana Geographic Information Office Library
- Approximate Site Boundary based on Lake County parcels.

Parcel ID: 45-03-35-301-003.000-004 15.777 acres
Parcel ID: 45-03-35-326-001.000-004 5.9 acres
Parcel ID: 45-03-35-326-002.000-004 40 acres

Orthophotography - Obtained from IndianaMap Framework Data
(www.indianamap.org)

Map Projection: UTM Zone 16 N **Map Datum:** NAD83

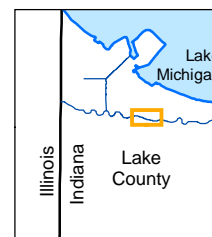


This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

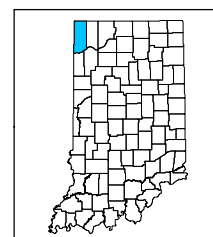
Mapped By: Mike Hill, Office of Land Quality
Date: 1/11/2011



Site Vicinity



Lake County, IN



APPENDIX 6
GARY DEVELOPMENTAL LANDFILL
WETLAND (PEMF)

Wetlands Location Map, Gary Development Landfill
Gary, Lake County, Indiana (U.S. EPA ID: IND077005916)



Sources:
Non Orthophotography Data
- Obtained from the State of Indiana Geographic Information Office Library
- National Wetlands Inventory data obtained from U.S. Fish and Wildlife Service
Orthophotography - Obtained from IndianaMap Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N Map Datum: NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.
Mapped By: Mike Hill, Office of Land Quality
Date: 4/20/2009



Wetland Classified PEMF
National Wetlands Inventory (USFWS)

